DataCatcher NEXT Ver.1.21B

USER'S MANUAL

CAUTION
WARNING

Please connect probes after the power supply of DC NEXT turns on.
Please do NOT turn off the power supply during the configuration.

HEARTLAND.DATA

DataCatcher NEXT USER'S MANUAL

This manual indicates the specifications, basic operations, and other detailed important information that helps you make better use of **DataCatcher NEXT**("DC NEXT").

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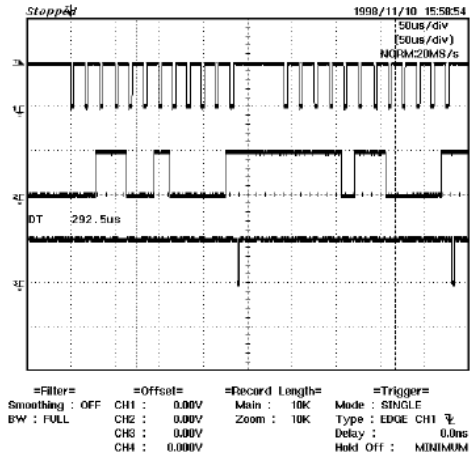
1. Features

1-1：General High Speed Communication Line Monitor

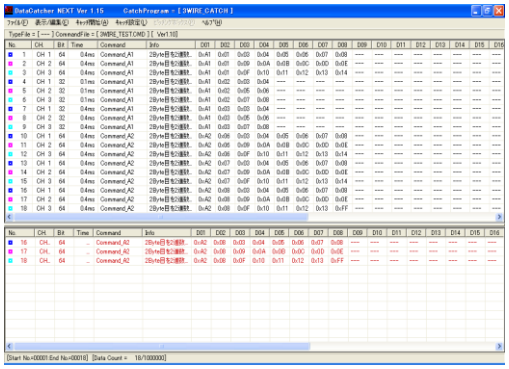
Data catcher DC2000 is the line monitor for embedded systems development, which was developed for the purpose of debugging of the communication of a microcomputer.
Formerly, to confirm the communication data, a signal was confirmed directly with digital oscilloscope etc. In the case that LSI that is connected with a microcomputer and serial or parallel interface is used and the system that does a communication with a microcomputer fellow, when I develop it.

Conventional method(digital oscilloscope)



1/0 bit pattern is transformed into a numerical value to confirm the contents of a communication. And, the procedure that understands the processing contents corresponding to the numerical value in reference to the specifications of LSI was necessary. Also, it was difficult to analyze the whole processing, because the surveillance in the long time is impossible in a digital oscilloscope.

Inovative method(DC NEXT)



Main Features of DC NEXT

(1)Dividing communication data as packet it displays it every 1 packet.
(2)It displays it clearly with the letter that the user defined communication data.
(3)The data that received it displays it with the real time.
(4)The interval of packet and packet it can measuring with 0.1/1.0msec resolution. Therefore, the inspection of the communication timing is easy.

We recommend DC NEXT to the following people.

Software Engineerof Embeded System

- Please use it for the reduction of debugging work.

Evaluation Engineer of Embeded System

- Please use it with the evaluation of software.

Hardware Engineer of Embeded System

- Please use it for the unification of the intention with a software engineer.

By using DC NEXT, the debugging work time of communication processing can be reduced substantially.

1-2:Pitching Function

This function can output the various kinds of signals.
You can use DC NEXT not only as a line monitor but as a command transmitter.
Supporting protocols are 3 wire synchronous serial communication, I2C, and UART.

Features

(1) DC NEXT can transmit data up to 16 bytes per 1 packet.
(2) DC NEXT has various FORMAT settings like CLOCK Frequency, CLOCK Edge, STB Edge, and so on.

2. Hardware Specifications

2-1: Catching Line

a) Max Channel	: 3CH
b) Input Format	: PULLDOWN to GND(1MΩ)
c) Input Voltage Range	: 0V to 5V
d) Input Level	: VB=1.8V , Hi=1V , Lo=0.5V
	: VB=3.3V , Hi=2V , Lo=0.9V
	: VB=5V Hi=3V , Lo=1.5V
e) Max Input Frequency	: 20MHz

2-2: Pitching Line

a) Max Channel	: 1CH
b) Output Format / Level	: Be equivalent to catching input Level (3 wire synchronous serial, UART)
	: Nch Open Drain(I2C)
c) Output Level	: 0V to 5V
d) Max Output Frequency	: 10MHz
e) Max Output Current	: VB=3.3V , 5.2mA
	: VB=5V , 7.8mA
	: VB=EXT(1.8) , 1mA

2-3: A/D Input

a) Max Channel	: 8CH
b) Input Format	: PULLDOWN to GND(100KΩ)
c) Input Voltage Range	: 0.1V to 4.9V
d) Sampling Frequency	: 1.25KHz / 6.25KHz
e) AD Input Resolution	: 8bit

2-4: External Trigger Input

a) Input Line	: 1CH
b) Input Format	: PULLDOWN to GND(1MΩ)
c) Input Voltage Range	: 0V to 5V
d) Input Level	: VB=1.8V , Hi=1V , Lo=0.5V
	: VB=3.3V , Hi=2V , Lo=0.9V
	: VB=5V , Hi=3V , Lo=1.5V

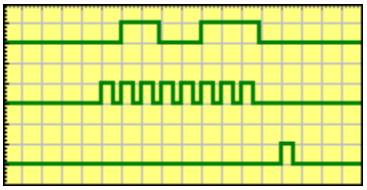
2-5: Event Output Line

a) Output Line	: 1CH
b) Output Format	: Be equivalent to catching input Level
c) Output Level	: 0V to 3.3V
d) Input Level	: VB=3.3V , 3mA
	: VB=5V , 5mA
	: VB=EXT(1.8V) , 1mA

3. Supporting Communication Protocols

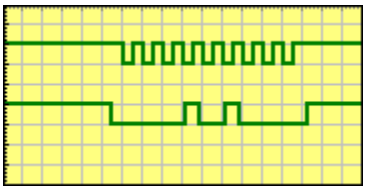
3-1:3 Wire Syncronous Serial Communication

- 3 wire synchronous serial communications has CLOCK, DATA, STB.
- Supported clock frequency Max 20MHz.
- 3ch is able to be used simultaneously.
- Even the communication type that there is not STB is able to take it as packet by the change of "the type file".
- Enable catch/pitch the communication data.



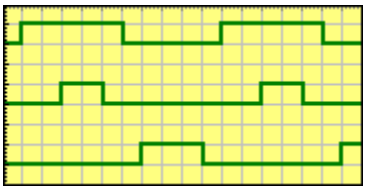
3-2:I2CBUS

- Supported Max 4MHz Clock Frequency
- You can use 2ch simultaneously
- Enable Data Pitch in Normal Mode(100KHz) or Fast Mode(400KHz).



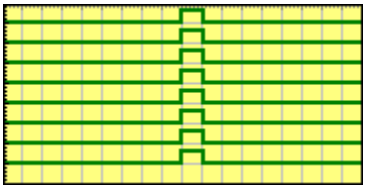
3-3:UART

- Supporting bitrate from 110bps to 921600bps
- You can use 2ch simultaneously
- Enable catch/pitch the communication data.



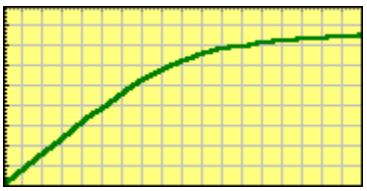
3-4:16bit Parallel

- Supported data lines Max 16 bit.
- Supporting Max 2MHz Clock Frequency



3-5:Data Logger

- CMOS Level Digital input line : 8ch.
  Sampling rate10KHz / 50KHz.
- AD convert ing input from 0.1V to 4.9V, 8bit resolution. : 8ch
  Sampling rate1.25KHz / 6.25KHz.



4. Comparative Tables of DC200 and DC NEXT

Function / SPEC		DC2000		DataCatcher NEXT
Three wire synchronous serial communicationData				
Data catch	Clock Frequency	2 MHz MAX	UP!	20 MHz MAX
	Transmit Capacity	8 Kbps	UP!	80 Kbps
	Restriction 1	One byte reception after, the next clock such time when becomes possible and receives.		
		5 us	UP!	50 ns
	Restriction 2	SUCH TIME WHEN THE STB SIGNAL OCCURS AND THE NEXT CLOCK BECOME POSSIBLE AND RECEIVE.		
		5 us	UP!	1 us
Data pitch	Output Frequency		NEW	10MHz MAX
UART *1				
Data catch	Clock Frequency	300 BPS to 57600 BPS	UP!	110 BPS to 921600 BPS
	Transmit Capacity	38400 bps	UP!	57600 bps
	Restriction	57600 BPS is 1CH only.	UP!	Possible to use with 921600BPS2CH simultaneously.
Data pitch	Output Frequency		NEW	110 BPS to 921600 BPS
I2C BUS *2				
Data catch	Clock Frequency	500 KHz MAX	UP!	4 MHz MAX
	Transmit Capacity	8 Kbps	UP!	80 Kbps
	Restriction 1	ExpanderBoard is necessary for 500KHzMAX. 1CH only.	UP!	The option board is unnecessary.Possible to use with 4MHz MAX2CH simultaneously.
	Restriction 2	One byte reception after, the next clock such time when becomes possible and receives.		
		5 us	UP!	100 ns
	Restriction 3	3Such time when stop condition occurs and the next clock become possible and receive.		
		5 us	UP!	1 us
Data pitch	Output Frequency		NEW	100KHz / 400KHz
Parallel communicationsData				
Data catch	Clock Frequency	200 KHz MAX	UP!	2 MHz MAX
	Transmit Capacity	1 Kbps	UP!	10 Kbps
	Input Data Bit	8 Bit MAX	UP!	16 Bit MAX
	Restriction 1	DATA holding time(time from clock high edge to DATA fix)		
		2 us	UP!	100 ns
	Restriction 2	SUCH TIME WHEN THE STB SIGNAL OCCURS AND THE NEXT CLOCK BECOME POSSIBLE AND RECEIVE.		
		5 us	UP!	1 us
Data logger				
Sampling time(frequency)		20usec(50KHz) /100usec(10KHz)	—	20usec(50KHz) / 100usec(10KHz)
Digital input (CMOS)		9 lines	—	8 lines
A/D input (0V～5V)		8 lines	—	8 lines
A/D input resolutionetc.		8 Bit	—	8 Bit
Etc				
Maximum data log number		100,000	UP!	1,000,000
Connection with PC		RS-232C	NEW	USB2.0
Input voltage range		0 to 5V <Threshold Level> HI = 2V ： Lo = 0.8V (TTL Level)	NEW	<Possible to switch> 3.3V/5V/1.8V to 5V(EXT) <Threshold level> VB = 1.8V HI = 1V ： Lo = 0.5V VB = 3.3V HI = 2V ： Lo = 0.9V VB = . 5V .HI = 3V ： Lo = 1.5V
Function easy data catch feature			NEW	Enable delaying timing for Data fix edge of Clock signal.This one enable to catch non-spire signal easily.

*1 : National Semiconductor UART 16550 compliance.

*2 : the Philips IICbus v2.1 compliance.

NOTE:
1, Enable to use the setting files, Log/Commnad/Type/Condition files, for DC2000 to DC NEXT

2. Transmit Capacity.
- Performance value as data catching 1ch in each communication
- Enable to catch the communication data within Transmit Capacity
- Displayed the message "FULL" on channel cell of log when Transmit Capacity over.

5. System Requirement

5-1: OS

Microsoft Windows XP, Windows Vista, Windows 7,

5-2: PC

PC/AT Compatible that above OS can work on.

5-3: CPU

Over 800MHz Intel Pentium Processor recommended

5-4: Memory

Over 256MB recommended

5-5: Others

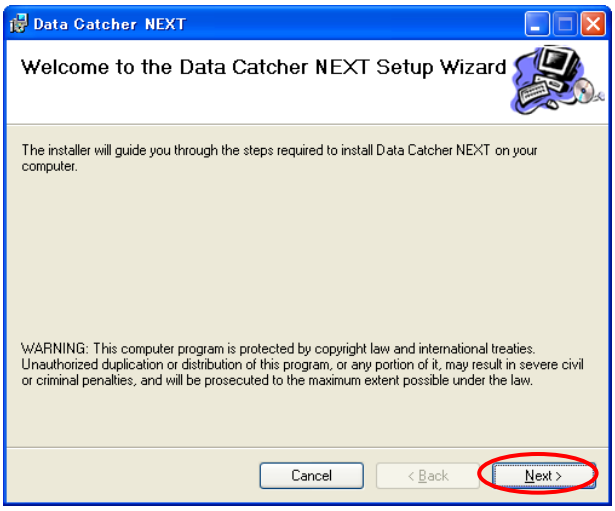
4MB available HDD space
USB 2.0 port

6. Install procedure

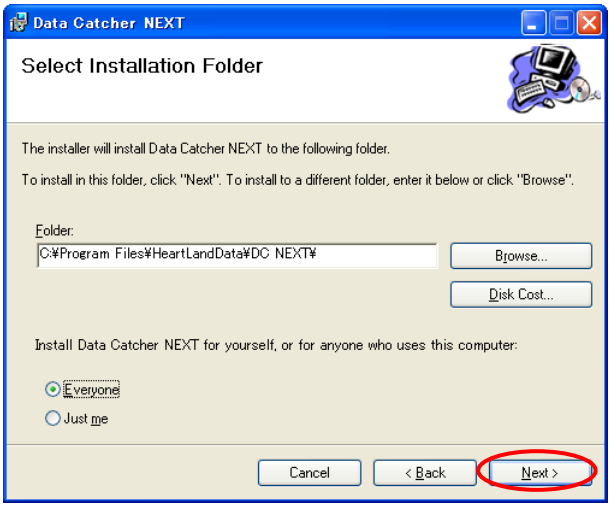
6-1：PC Application

1. Insert the attached CD-ROM "DC NEXT Install Disc" to CD-ROM drive,
   then click the icon [dcnext_Install.exe.]

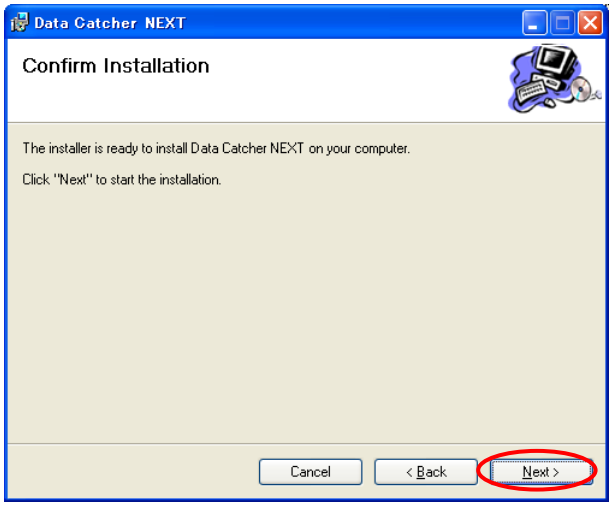
2. Click [Next] after [Welcome to the Data Catcher NEXT Setup Wizard] shown.


Data Catcher NEXT
Welcome to the Data Catcher NEXT Setup Wizard
The installer will guide you through the steps required to install Data Catcher NEXT on your computer.
WARNING: This computer program is protected by copyright law and international treaties. Unauthorized duplication or distribution of this program, or any portion of it, may result in severe civil or criminal penalties, and will be prosecuted to the maximum extent possible under the law.
Cancel
< Back
Next >

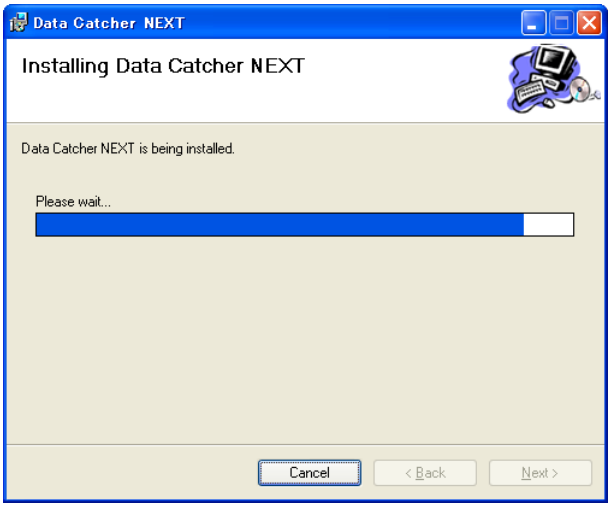
3. Click [Next] after [Select Installation Folder] shown.
   NOTE:
   "C:/Program Files/HeartLandData/DC NEXT" is selected as default setting.
   Please click [NEXT] if it is available for you.
   If you would like to install to another folder, please click [Browse] and then select the folder.


Data Catcher NEXT
Select Installation Folder
The installer will install Data Catcher NEXT to the following folder.
To install in this folder, click "Next". To install to a different folder, enter it below or click "Browse".
Folder:
C:¥Program Files¥HeartLandData¥DC NEXT¥
Browse...
Disk Cost...
Install Data Catcher NEXT for yourself, or for anyone who uses this computer:
Everyone
Just me
Cancel
< Back
Next >

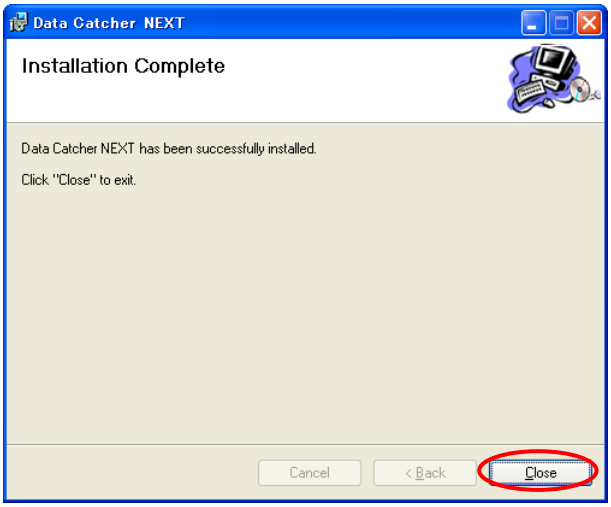
4. Click [Next] after [Confirm Installation] shown.


Data Catcher NEXT
Confirm Installation
The installer is ready to install Data Catcher NEXT on your computer.
Click "Next" to start the installation.
Cancel
< Back
Next >

5. [Installing Data Catcher NEXT] is shown during installing.



6. Click [Close] after [Installation Complete] shown.
Please take out the CD-ROM "DC NEXT Install Disc" after click [Close].



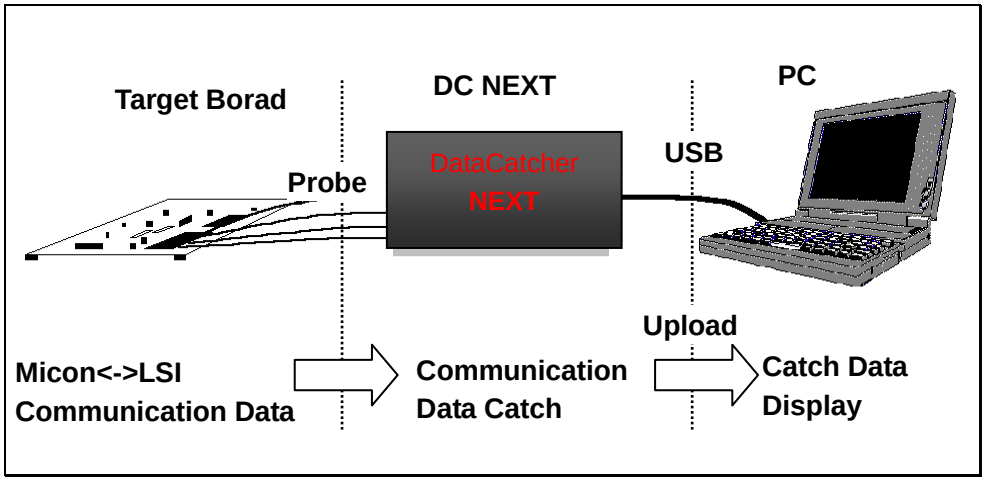
Installation completed.

6-2: USB Driver Installaion

1. Connect DC NEXT body with PC by the attached USB cable.
2. Power up DC NEXT.
   Connect AC adapter with DC NEXT, then switch [POWER] ON in front of DC NEXT body
3. Confirm lighting of LED.
   [POWER] LED blue light when power up D NEXT.
   [CONNECT] LED lights after 20sec from power up.
   CAUTION : Power on while unfastening prove.
4. The Found New Hardware Wizard is appears.
   Select [Install from a list or specific location (Advanced)] and then click [Next].
5. Select [Search for the best driver in these locations] .
6. Check [Include this location in the search] then click [Browse] .
   Select "../ HeartLandData/DC NEXT/driver", and then click [OK] .
   Confirm folder path shown in text box and then click [Next].
7. Message ["HLDC DataCatcherNEXT " has not passed Windows Logo testing to verify its compatibility with WindowsXP.] should appears.Click [Continue Anyway].
8. [Completing the Found New Hardwre Wizard] is appears.
   Click [Finish]
   Installation complete.

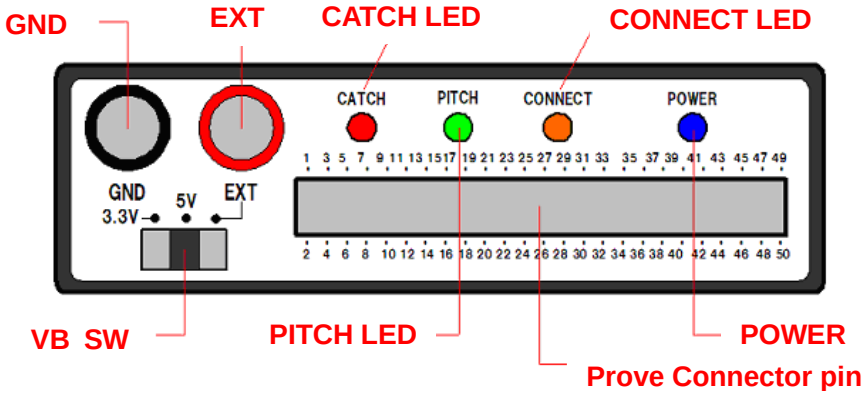
7. DC NEXT structure

DC NEXT catches the communication data on target board and uploads it to PC.
PC receives the data, analizes and then shows on the monitor.

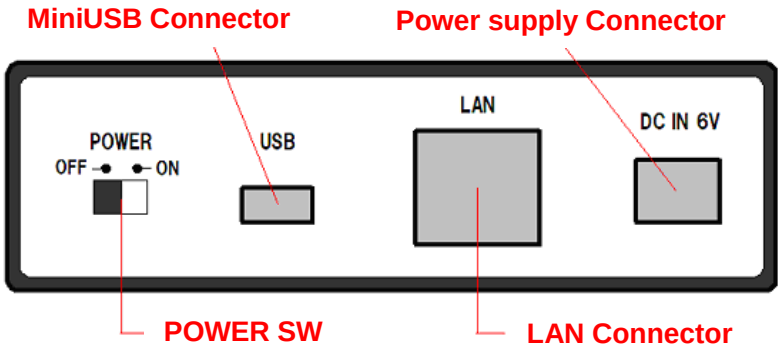


8. DC NEXT Overview

8-1: Front



8-2: Back



8-3: Construction

GND	GND terminal for DC NEXT board. Connect with target system by attached GND cable
EXT	Input terminal for external power supply. Connect with power supply to adjust input voltage by it.
VB SW	SW to change the input voltage range for DC NEXT. Selectable 3.3V or 5V or EXT. Please select EXT when you use the external power supply.
CATCH LED	Lighting while catching the communication data.
PITCH LED	Lighting while pitching the communication data.
CONNECT LED	Lighting while connecting DC NEXT electrically.
POWER	Lighting while power supplying to DC NEXT board.
Prove Connector pin	Connect the communication line by using attached prove. Posision depends on the communication format. Please refer to Connector List.
POWER SW	Power SW for DC NEXT board.
MiniUSB Connector	Connect with PC by using attached USB cable.
LAN Connector	Not used.
Power supply Connector	Connect with attached AC adapter.

9. Hardware handling

9-1: DC NEXT board boot procedure

1. Connect with PC.
   Connect PC with DC NEXT BOARD by attached USB cable.

2. Power on.
   Power on by POWER SW after insert AC adapter.
   [POWER] lights blue after Power on.
   [CONNECT] lights after 20sec from Power on.
   Setup complete.

3. Start Application.
   Boot PC Application.
   Please refer to "10-1:DC NEXT boot" .

4. Connect GND.
   Connect with DC NEXT board attached GND cable.

5. Select the input voltage range.
   Select the input voltage range by VB SW.
   Connect EXT pin with target board VDD when DC NEXT catches the data on BUS line not over 3.3V.

6. Connect communication line.
   Connect communication line with DC NEXT board attached prove cable.
   Posision depends on the communication format
   Please refer to Connector List.

9-2: NOTE

Please take care following items for hardware:

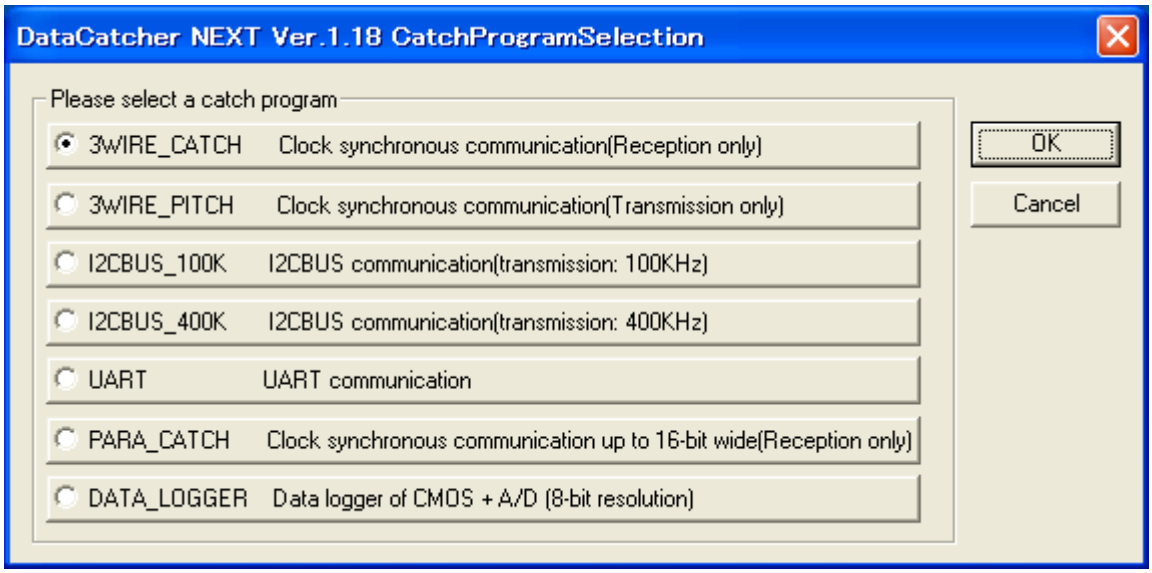
- Power on while unfastening prove.
- Connect target GND with DC NEXT board GND.
- Do not power off during configuration by changing the Catch Program.
- It takes time 20sec for firmware update by configuration. Do not power off during this one.
- Check the power setting of your PC when you catch the data long long time to prevent power cut for HDD automatically or Windows transmitring to standby mode.

10. Basic Operation

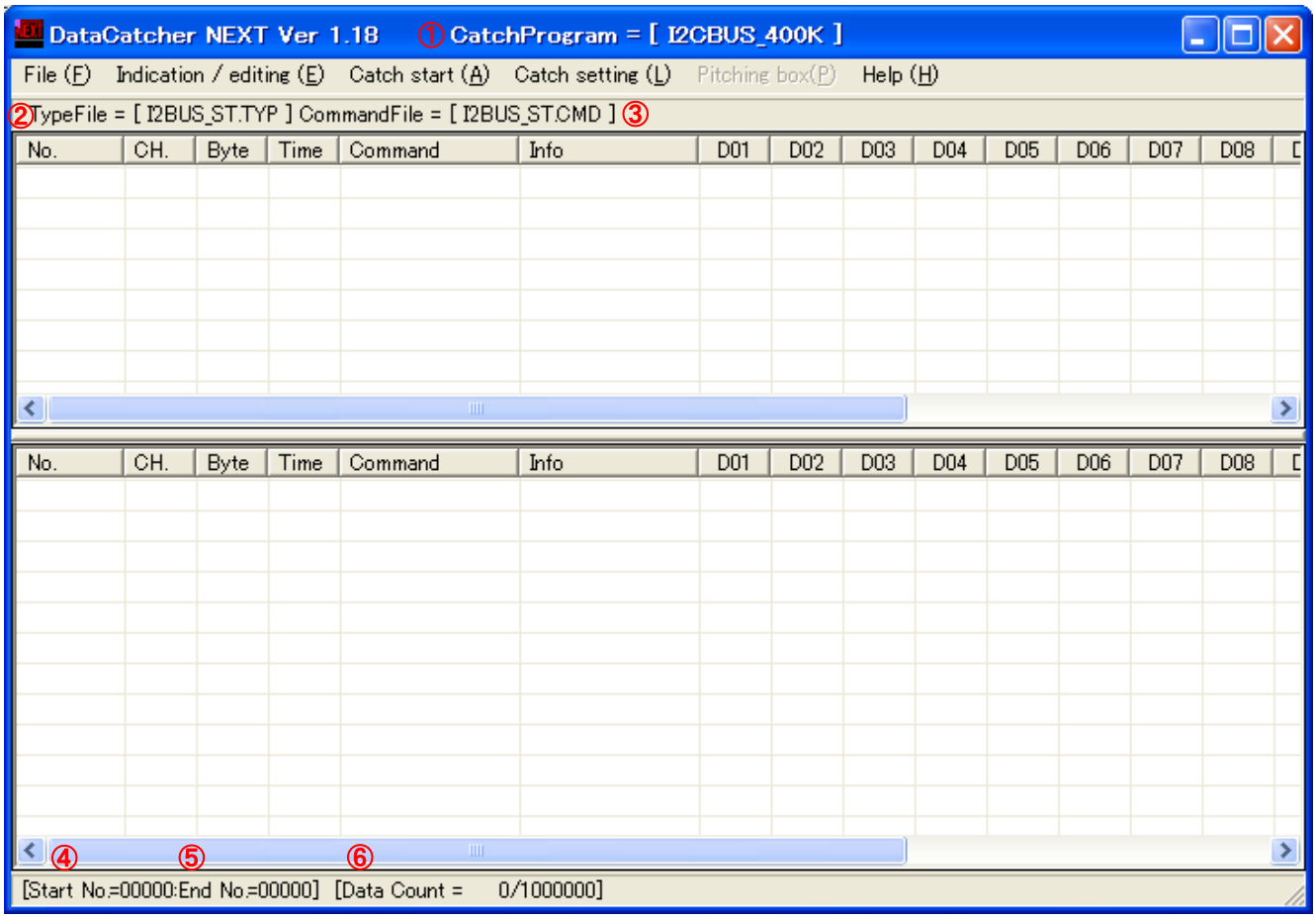
10-1: Start Up DC NEXT

1. Double-click the [DC NEXT] Icon or Select the[Data CatcherNext]Program.

2. Select CatchProgram.
   Data log window is shown by select Catch Program and then click [OK].
   If [Cancel] is clicked, data log window is shown as 3WIRE_CATCH.


DataCatcher NEXT Ver.1.18 CatchProgramSelection
Please select a catch program
3WIRE_CATCH Clock synchronous communication(Reception only)
3WIRE_PITCH Clock synchronous communication(Transmission only)
I2CBUS_100K I2CBUS communication(transmission: 100KHz)
I2CBUS_400K I2CBUS communication(transmission: 400KHz)
UART UART communication
PARA_CATCH Clock synchronous communication up to 16-bit wide(Reception only)
DATA_LOGGER Data logger of CMOS + A/D (8-bit resolution)
OK
Cancel

10-2: Configuration


DataCatcher NEXT Ver 1.18
① CatchProgram = [I2CBUS_400K]
File (F) Indication / editing (E) Catch start (A) Catch setting (L) Pitching box(P) Help (H)
②TypeFile = [I2BUS_ST.TYP] CommandFile = [I2BUS_ST.CMD] ③
No. CH. Byte Time Command Info D01 D02 D03 D04 D05 D06 D07 D08
④ ⑤ ⑥
[Start No.=00000:End No.=00000] [Data Count = 0/1000000]

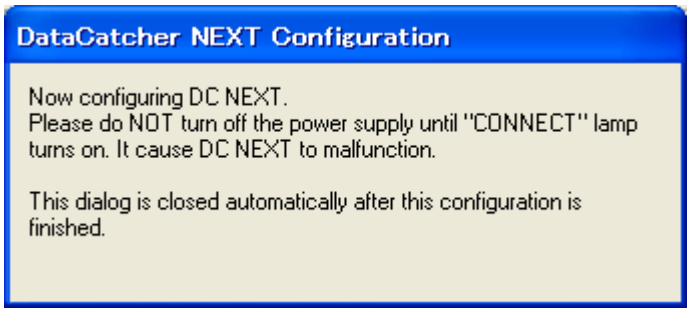
1. Log window is shown.

1	The catch program name that selected it is shown.
2	The file name of the catch type that selected it is shown.
3	The definition file name for the command analysis in the selection is shown.
4	Start No. of catch data is shown.
5	Completion No. of catch data is shown.
6	The data number that received it is shown.

The communication data of 1,000,000 packet can be received.
Also, communication packet over 1,000,000 packet case receive it with the ring form.

2. Configuration.

Application checks firmware of DC NEXT BOARD after click [Catch Start].
It starts to catch the communication data if [CatchProgram] conforms to NEXT board firmware.
If it does not conform, following message is shown on the monitor.
And then the firmware corresponding CatchProgram is written.

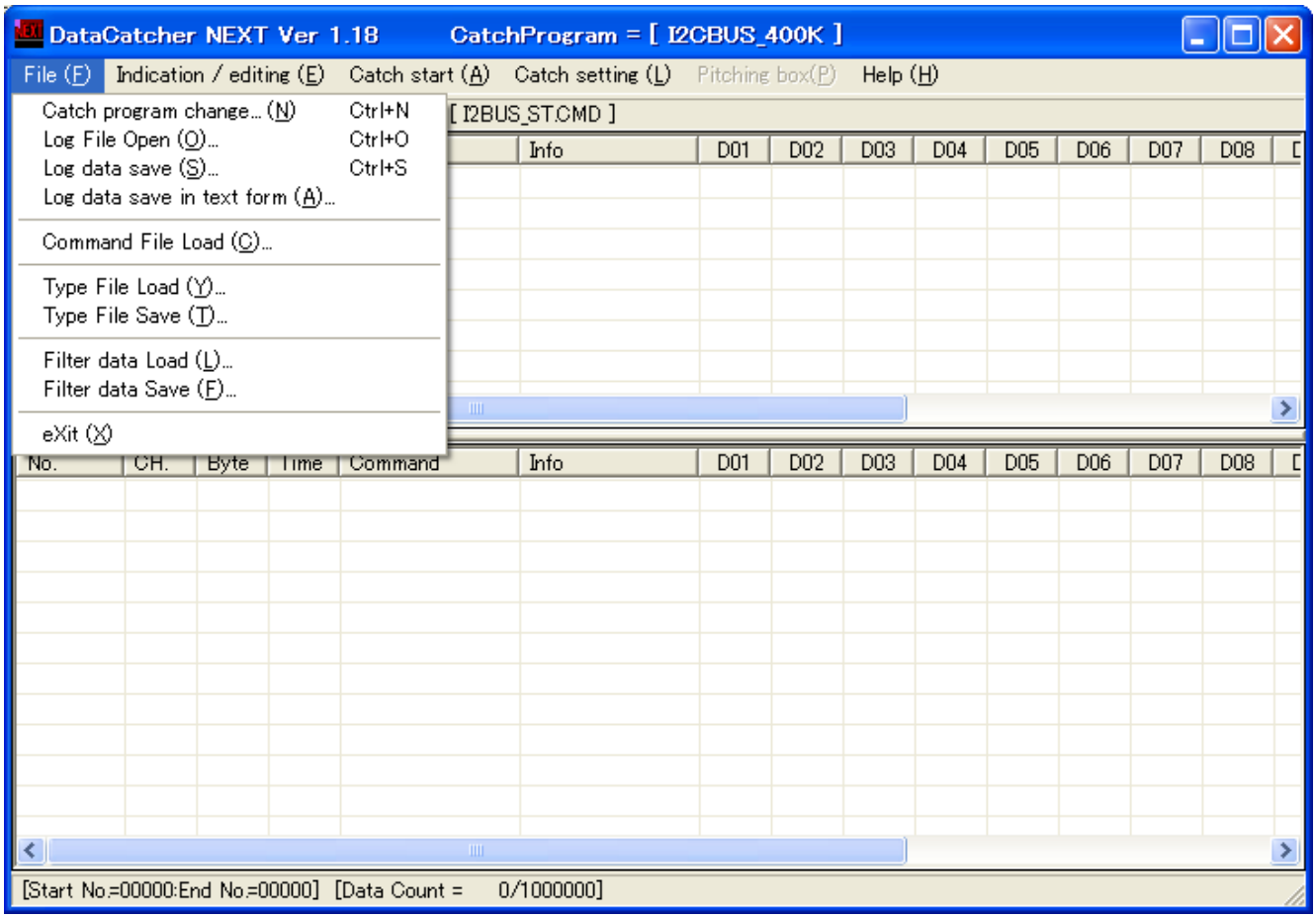

DataCatcher NEXT Configuration
Now configuring DC NEXT.
Please do NOT turn off the power supply until "CONNECT" lamp turns on. It cause DC NEXT to malfunction.
This dialog is closed automatically after this configuration is finished.

It takes 20sec.
Available after DC NEXT BOARD [CONNECT] lighting.

[CAUTION] Please do NOT turn off the power supply during the configuration.

10-3: Various File Operation

The file menu does the save of reading and, log file of a/the type file, command file.



-A catch program change --- This does the change of the catch program.
In this way, even the catch data is clear.

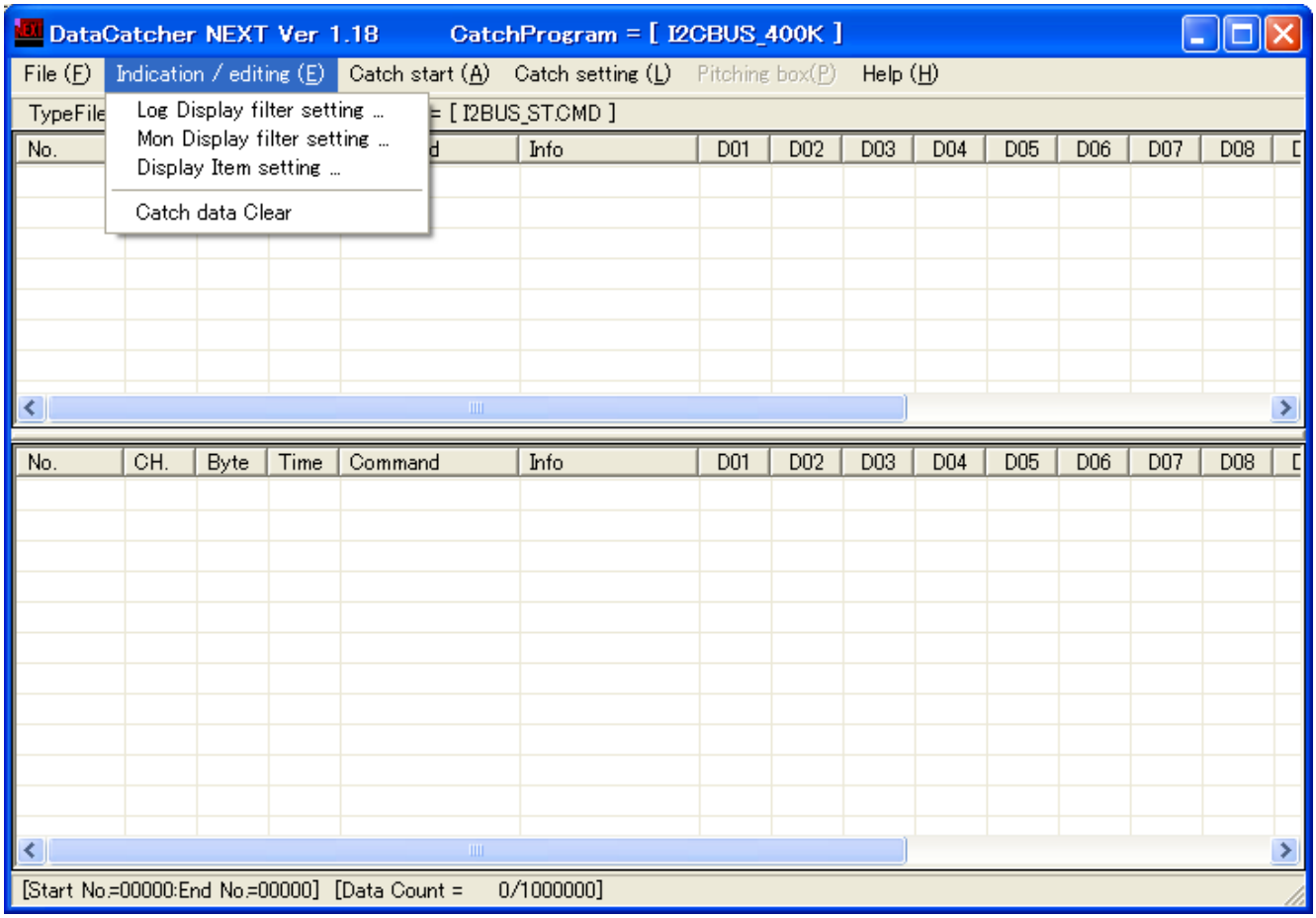
-I open a log file --- The log file of the log form is opened.
The display contents are displayed with the contents that were displayed to before.

-A log file save --- This preserves catch data with the log form.

-I save it in a text form	---	The catch data is preserved with the text form. This preservation form is the one that divided each data period with a ",". Therefore the editing is possible with EXCEL etc.
-Command file choice	---	This reads the command file. The extension of this file is cmd.
-I open a type file	---	This reads the typ file. The setting contents for the communication type are preserved, in a type file.
-A type file save	---	The setting contents for the communication type are preserved. Please refer to the manual for each catch program about the setting of a catch type.
-I open a condition file	---	This reads the bit file. The setting contents for the various kinds filter are preserved, in a bit file.
-A condition file save	---	This preserves the setting contents of the various kinds condition to the bit file.
-The end of an application	---	The data catcher is ended.

10-4: Display Operation

This section explains it about the operation of display data.



- Log Display filter setting : Setting for limitation of log data display.
  Log Display filter setting window is opened by select this one.

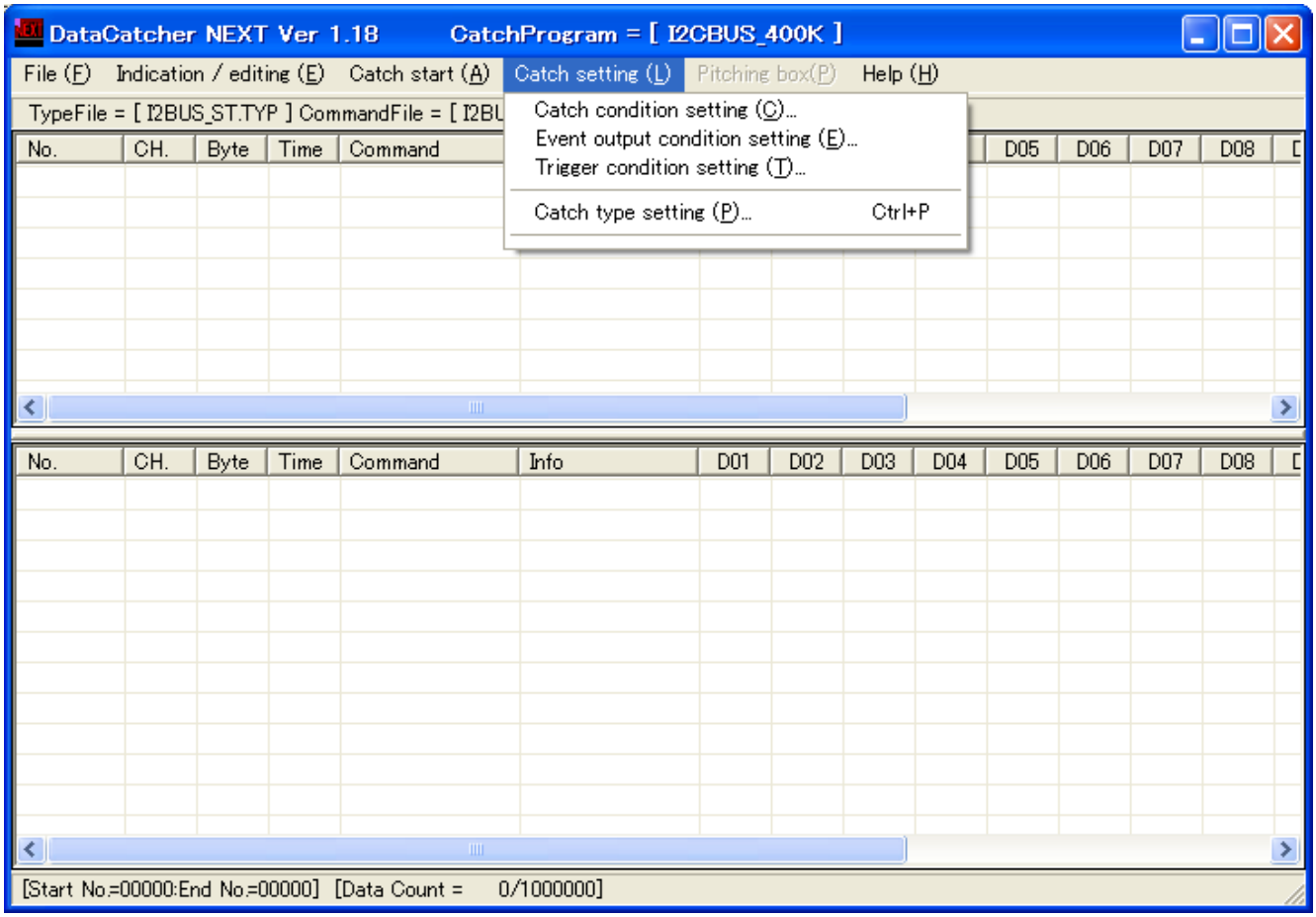
- MON Display filter setting : Setting for limitation of monitor data display.
  MON Display filter setting window is opened by select this one.

- Display item setting : Setting for display type of items.
  Display item setting window is opened by select this one.

- Catch data clear : Clear the displayed data on the monitor.

10-5: Catch Setting Menu

By this menu, you can set up filter condition and, event, trigger condition of catch data.



-Catch condition setting

You can reject, and also receive the only communication data that agreed with the condition, by setting up the filter condition.
When this item is selected the catch filter setting window opens.

-Event output condition setting

When the data that agreed with a designated condition is received the event can be output.
When this item is selected the event filter setting window opens.

-Trigger condition setting

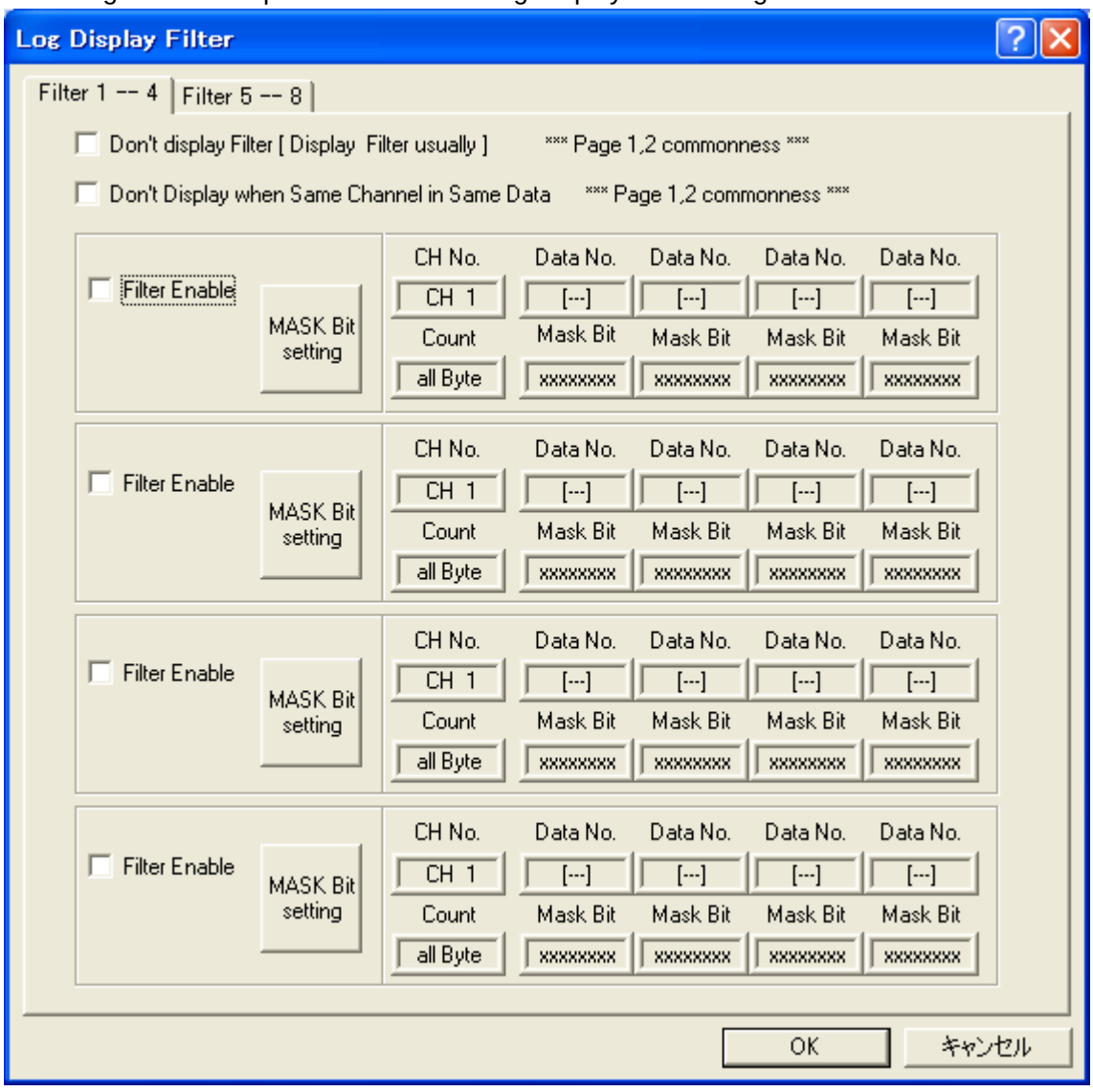
When the data that agreed with the condition is received the condition that does the catch start/stoppage can be set up.
When this item is selected the trigger condition setting window opens.

-Catch type setting

Please refer to the manual for each catch program.

10-6: LOG Display Filter Setting Window

Following window is opened after select Log Display filter setting.



[About each setting content]

-I set it as the filter which I do not display [I set it as a filter to display usually] check box

- Only the data in accord with a/the condition does not display it in the case of on.
  Only the data in accord with the condition displays it in the case of off.
- This check box is common setting for all filter setting.。

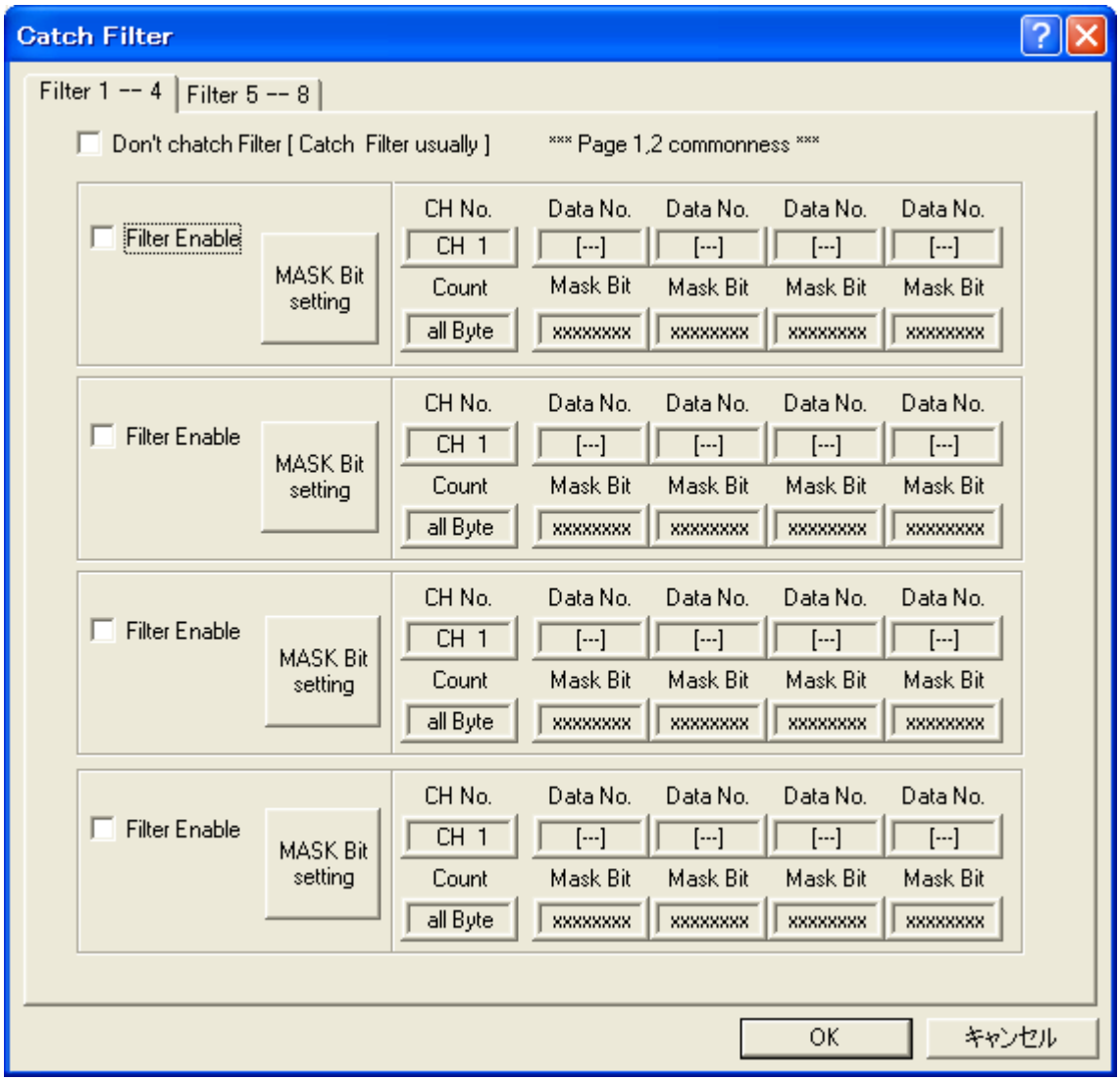
- Don't Display when Same Channel in Same Data.
  - ON : When same data are catched over twice, 2nd or later are not shown.
    OFF : All catched data are shown withour change.
  - This check box is common setting for all filter setting.

-Filter effective check box
  - You can do the filter condition that was checked effectively.
    The check is not applied about the condition without being done.

-MASK Bit setting button
  - When you push this button the setting window of the mask bit can be opened.

10-7: Catch Filter Setting Window

Following window is opened after select Catch filter setting.



[Settings]
- [Don't Catch Filter[Catch Filter usually]] check box.
  - ON : Filter setting is used as not to Catch the data conforming setting data.
    OFF : Filter setting is used as to Catch the data conforming setting data.
  - This check box is common setting for all filter setting.。

-Filter effective check box

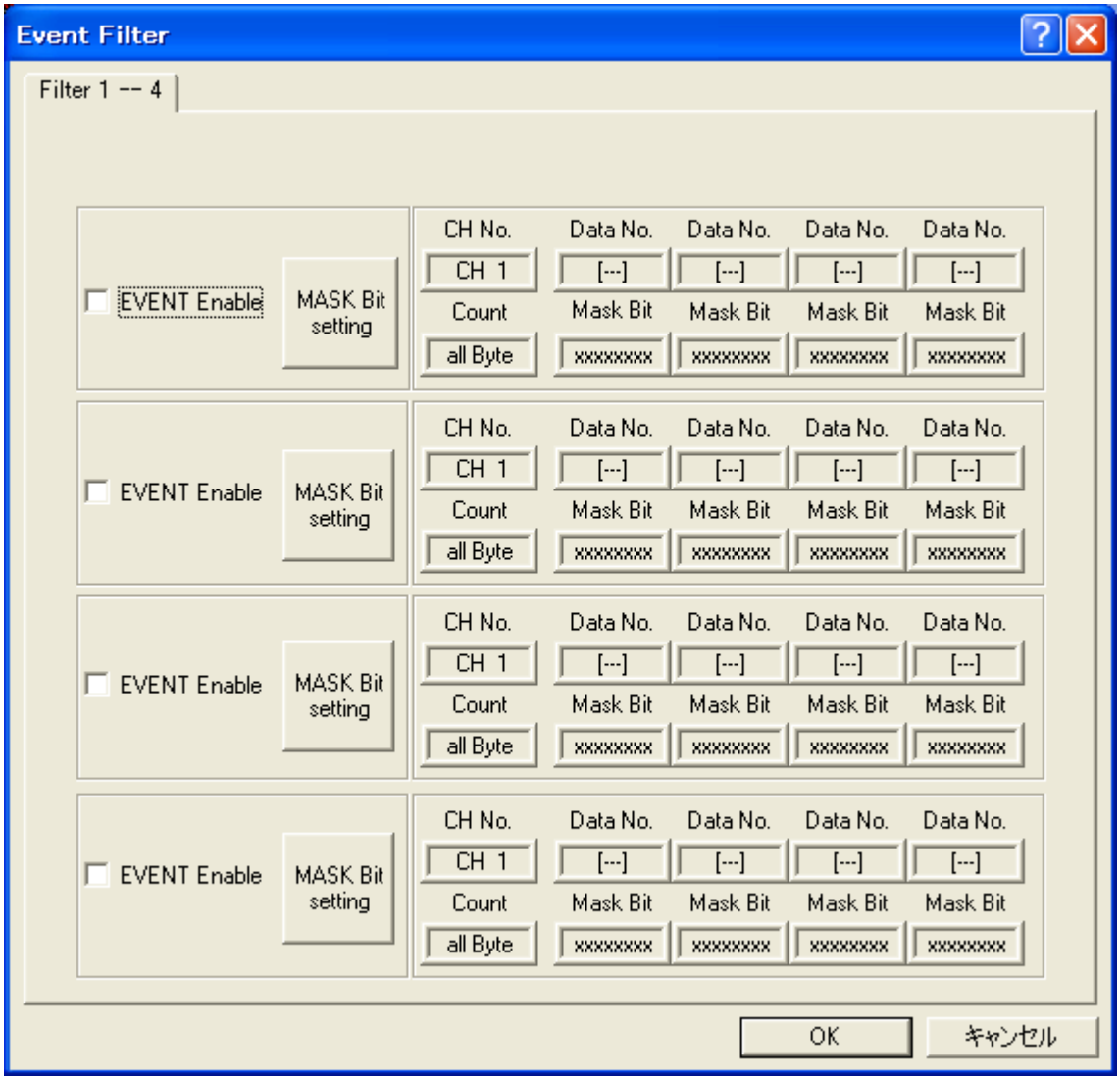
- You can do the filter condition that was checked effectively.
  The check is not applied about the condition without being done.

-MASK Bit setting button

- When you push this button the setting window of the mask bit can be opened.

10-8: Event Filter Setting Window

When [Event output condition setting] is selected this window opens.



-EVENT effective check box

Available only filter condition checked.
Not available others.
EVENT output port becomes 0V with a catch start.
When catch data agrees with the setting condition EVENT output port becomes 5V.

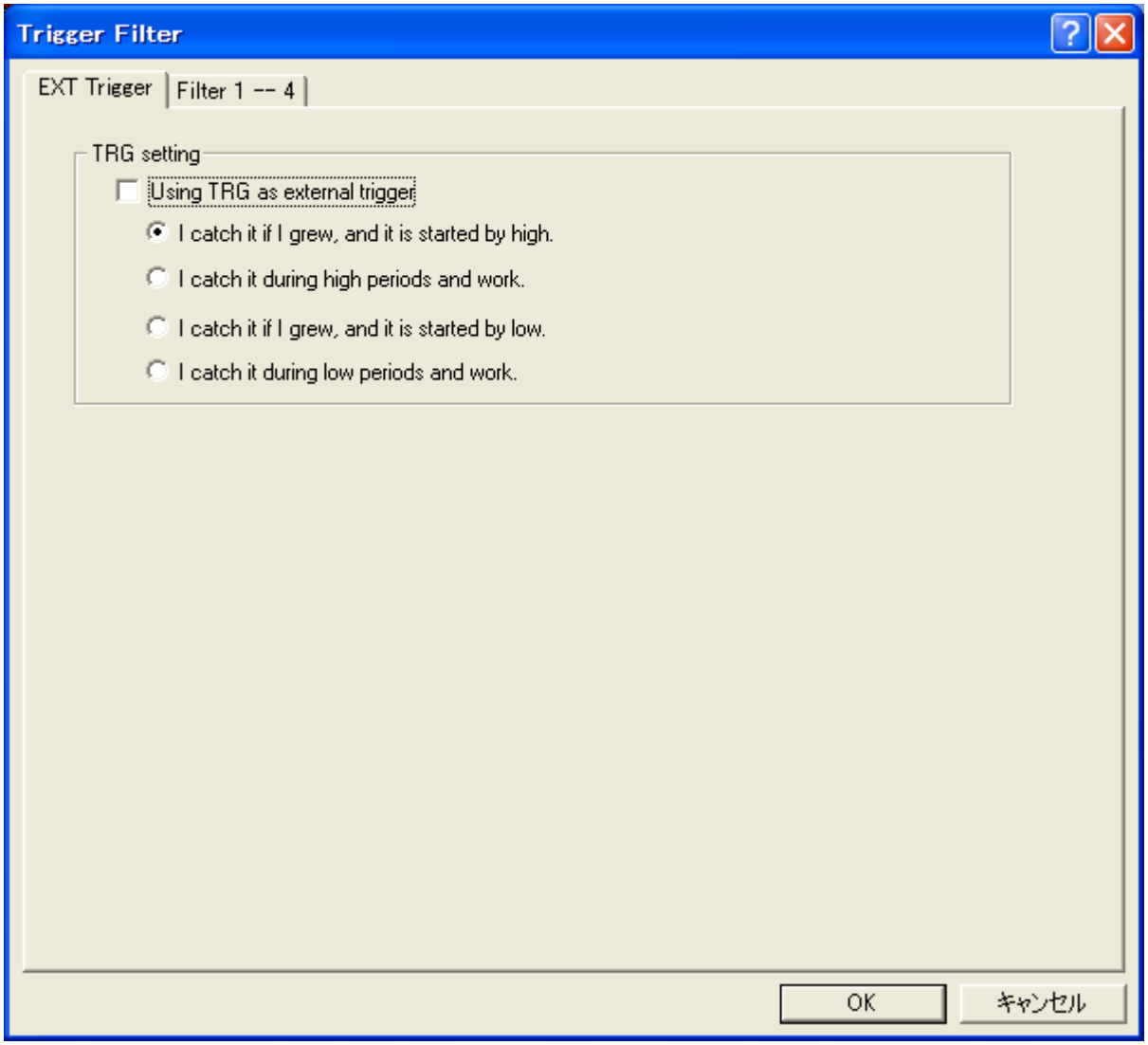
-MASK Bit setting

You can open the setting window of a/the mask filter, by clicking this button.

10-9: Trigger Filter Setting Window

When trigger condition setting is selected the following window opens.

- Page1 -


Trigger Filter
EXT Trigger
Filter 1 -- 4
TRG setting
Using TRG as external trigger
I catch it if I grew, and it is started by high.
I catch it during high periods and work.
I catch it if I grew, and it is started by low.
I catch it during low periods and work.
OK
キャンセル

-「Using TRG as external trigger」check box
  - You can select the trigger port.

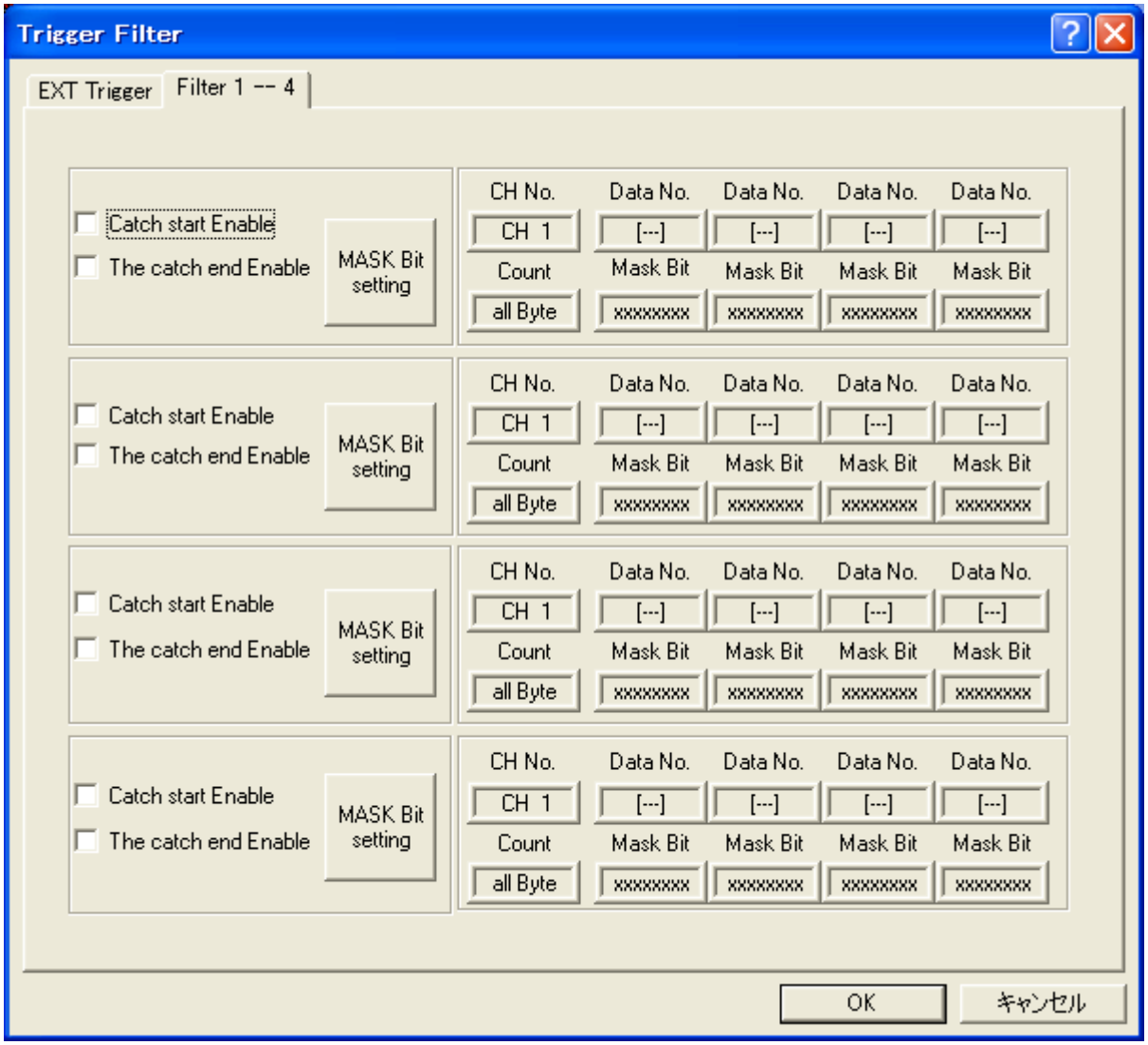
    - [I catch it if I grew, and it is started by high] Radio button
      - Detecting that the condition of the trigger port became HI the catch is started.

    - [It is Catch movement during high periods] Radio button
      - Trigger port does a catch only the period of HI.

    - [I catch it if I grew, and it is started by low] Radio button
      - Detecting that the condition of the trigger port became LOW the catch is started.

    - [I catch it during period of low and work] Radio button
      - Trigger port does a catch only the period of LOW.

- Page 2-



-Catch start is effective check box

- Catch is started by the detection of the data that agreed with the setting condition, by turning on this check box.

-The catch end is effective check box

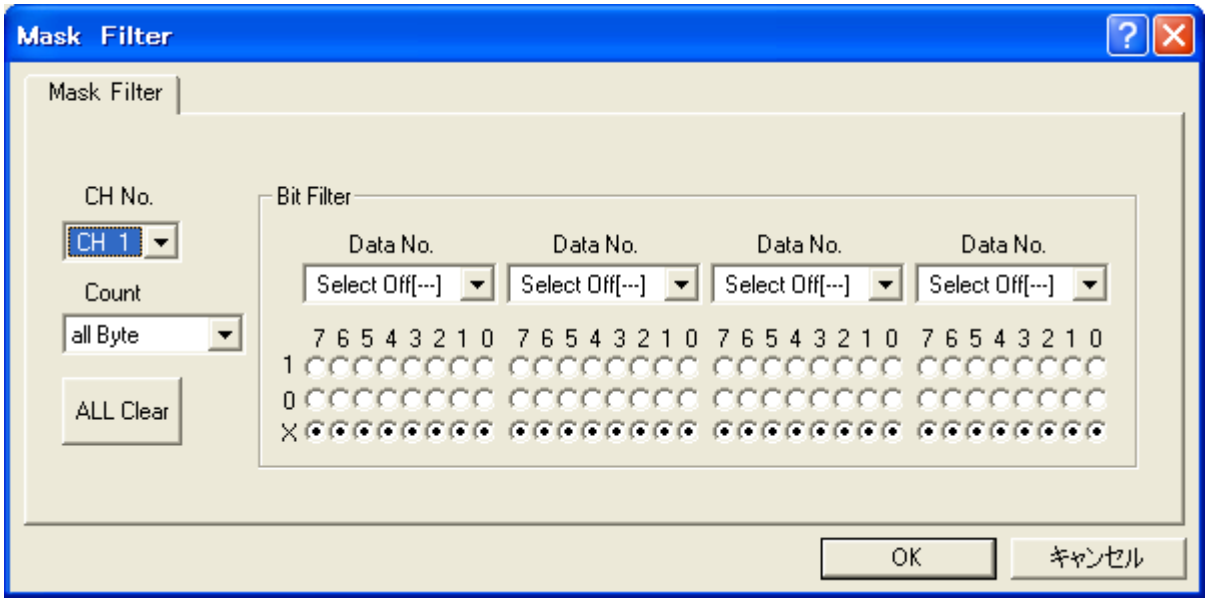
- Catch is stopped by the detection of the data that agreed with the setting condition, by turning on this check box.

-MASK Bit setting

- You can open the setting window of a/the mask filter, by clicking this button.

10-10: Mask Filter Setting Window

By clicking the MASK Bit setting button that is in a various kinds filter setting window the following window is displayed.



-CH No. Dropdown list
- You can select the channel that sets up the mask filter.

-Count Dropdown list
- You can designate it with Byte or Bit unit about the length of the communication packet that applies the setting condition. The unit differs by each catch program.

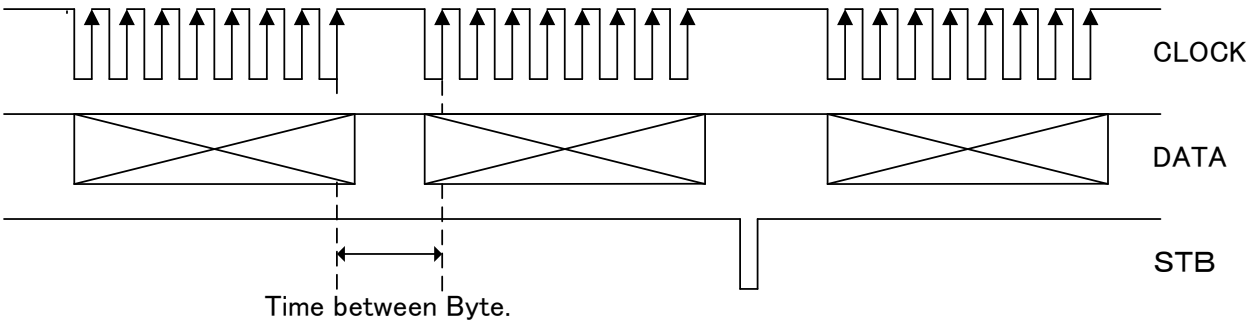
-ALL Clear button
- All the setting conditions are initialized.

-Bit Filter field
- You can set up the filter condition with a bit unit.
  - Data No. Dropdown menu
    - You can select DATA No. that sets up the filter condition.
  - Radio button for bit setting
    - You can designate the data that becomes a filter condition every 1 bit. X shows don't care.

11. Signal that is able to catch by [3WIRE CATCH]Catch Program

11-1: Wave Form of 3 Wire Serial Communication

DC NEXT supports the following “3 wire serial communication.



There is a STB signal general "3 line synchronous serial communications",
the catch is possible regarding the type that there is not a STB signal.

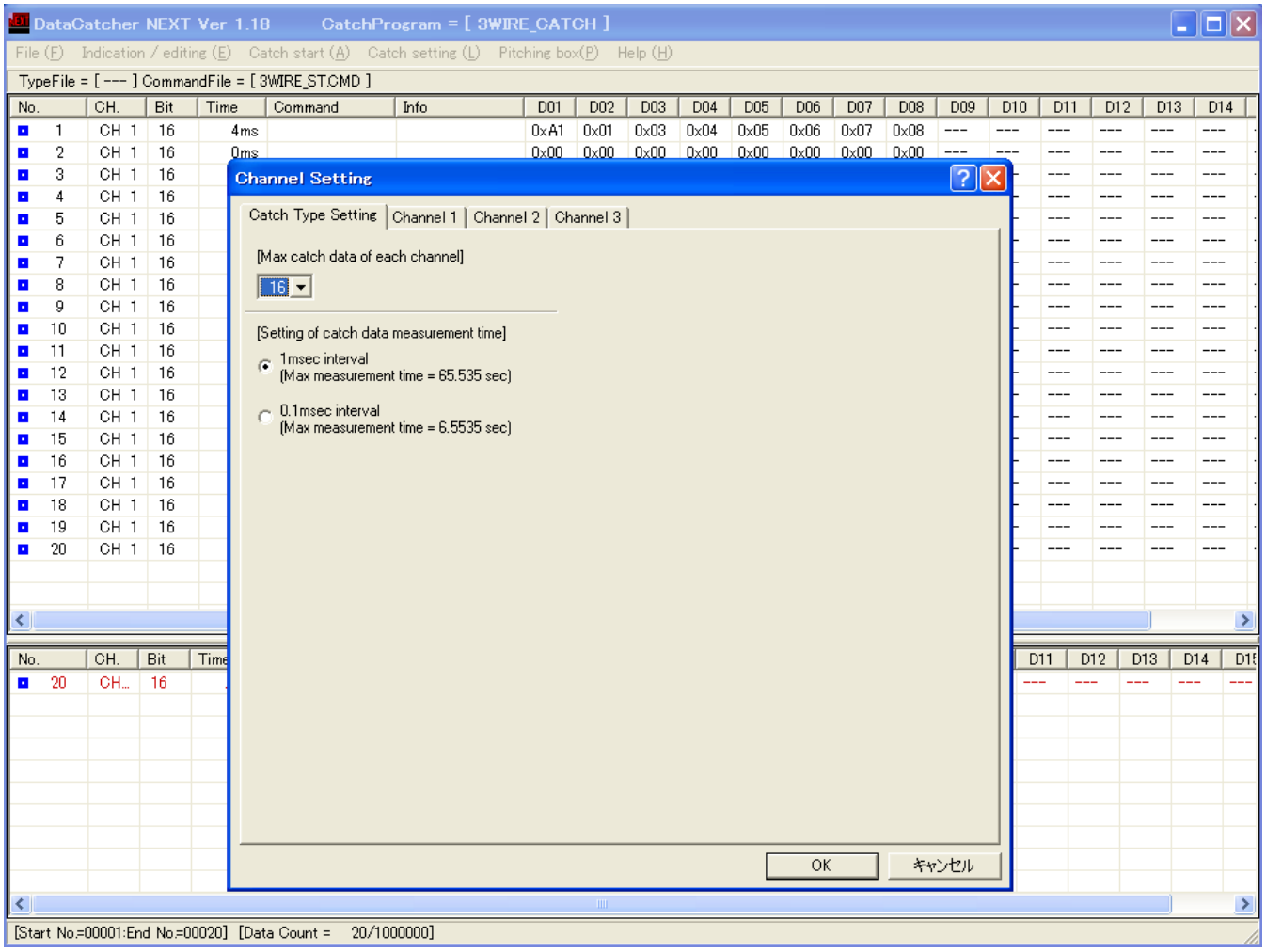
- Form that settles communication packet in the time between Byte.
- Form with the data that designates the length of communication packet into communication data.
- Form with the data that instructs the completion of communication packet.
- Form with the data that settles the length of communication packet.

12. Setting of [3WIRE CATCH]Catch Program

<Channel Setting> the dialog box can be opened with [Catch setting (L)]-[Catch type setting (P)] of the click.

By changing this setting various 3 wire serial communications can be received.

The setting contents it does explanation below.


DataCatcher NEXT Ver 1.18
CatchProgram = [3WIRE_CATCH]
File (F) Indication / editing (E) Catch start (A) Catch setting (L) Pitching box(P) Help (H)
TypeFile = [---] CommandFile = [3WIRE_ST.CMD]
Channel Setting
Catch Type Setting
Channel 1
Channel 2
Channel 3
[Max catch data of each channel]
16
[Setting of catch data measurement time]
1msec interval
(Max measurement time = 65.535 sec)
0.1msec interval
(Max measurement time = 6.5535 sec)
OK
キャンセル
[Start No.=00001:End No.=00020] [Data Count = 20/1000000]

12-1:〈Catch Type Setting〉the setting contents in this tag

[Max catch data of each channel]

<Max Length>

The number of the DATA line that is displayed to the screen is set up.

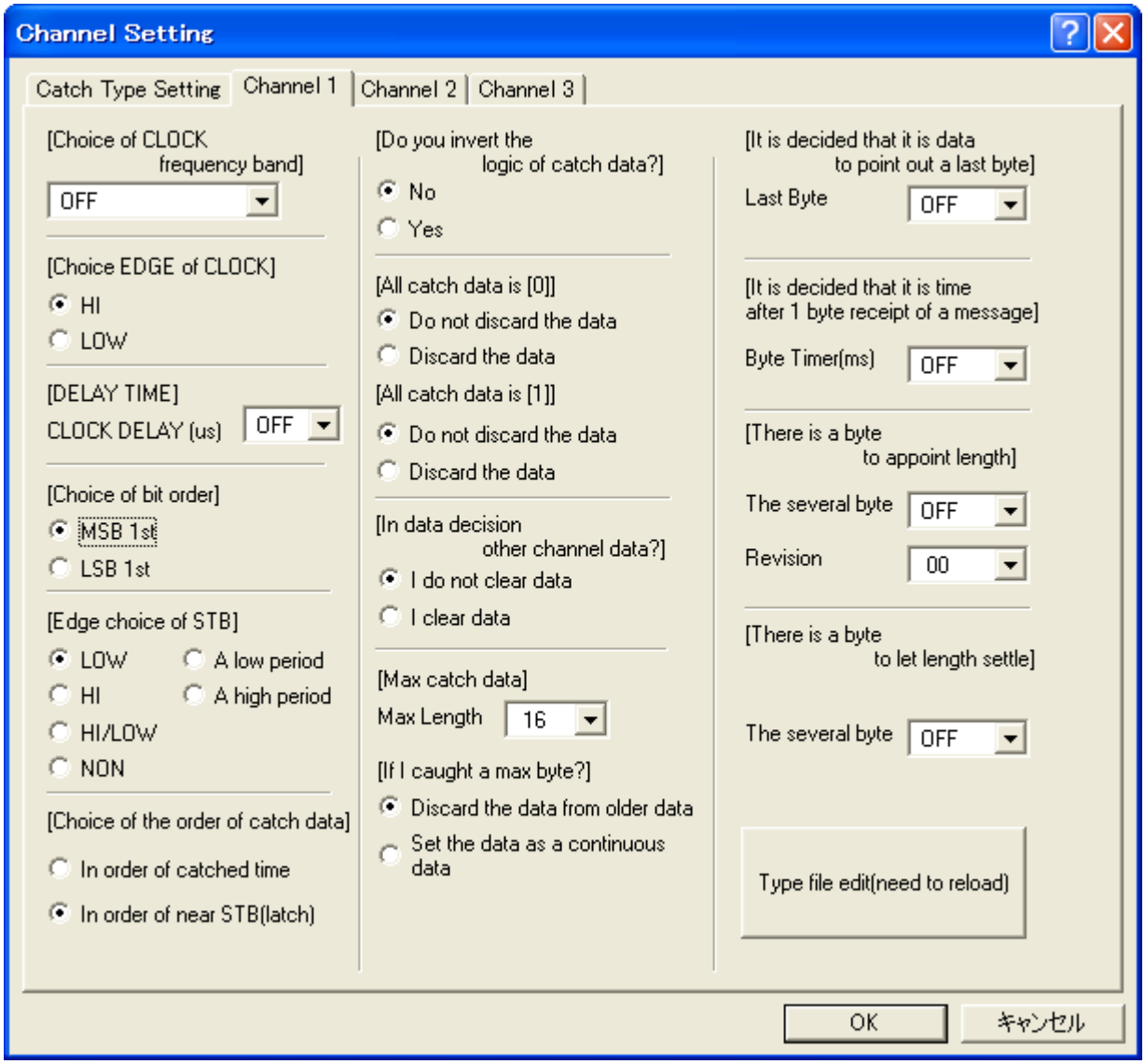
When Max Length is set up with 10 D01-D10 is displayed to the DATA line.

MAX value is 32.

[Setting of catch data measurement time]

Data catcher measures the time from the settlement of the settlement to, present communication packet of the communication packet of before and display.

You can set up the resolution in measuring time.



12-2:〈Channel1〉〈Channel2〉〈Channel3〉 the setting contents in this tag

[Choice of CLOCK frequency band]

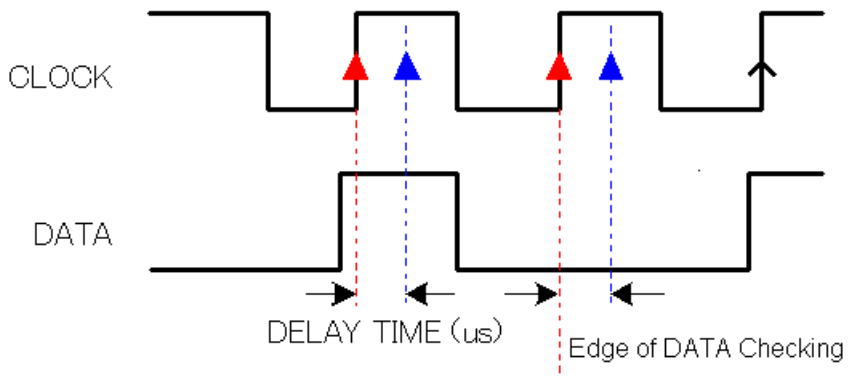
Select CLOCK frequency band of communication signal.
Enable to catch although select [OFF].
Enable to catch tolerably for blunt Hi/Low edge.
* When DC NEXT cannot catch target signal, please use this one.

[Choice EDGE of CLOCK]

Select edge of CLOCK.

[DELAY TIME]

Enable DELAY setting for the timing that CLOCK line checks DATA signal.
OFF : Checking Data signal by edge of CLOCK signal.
Enable to catch tolerably for blunt Hi/Low edge.
* When DC NEXT cannot catch target signal, please use this one.



* When DC NEXT cannot catch target signal, please use this one.

[Choice of bit order]

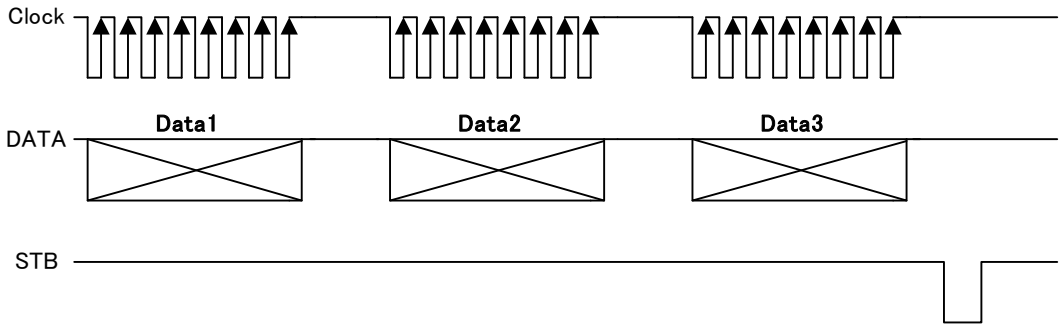
Serial transmission method is selected.

[Edge choice of STB]

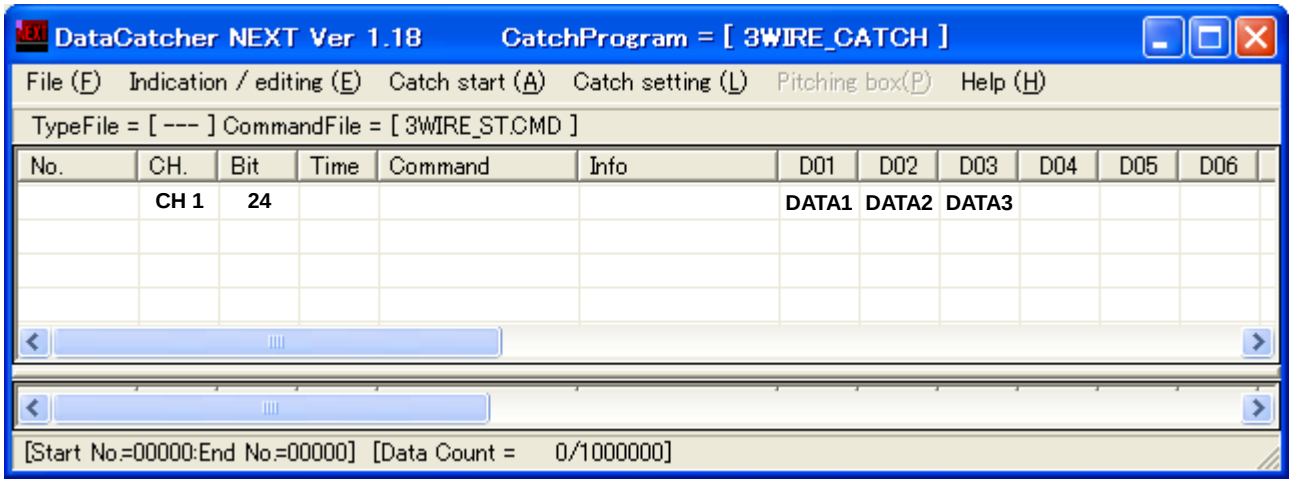
EDGE of STB signal is selected.

[Choice of the order of catch data]

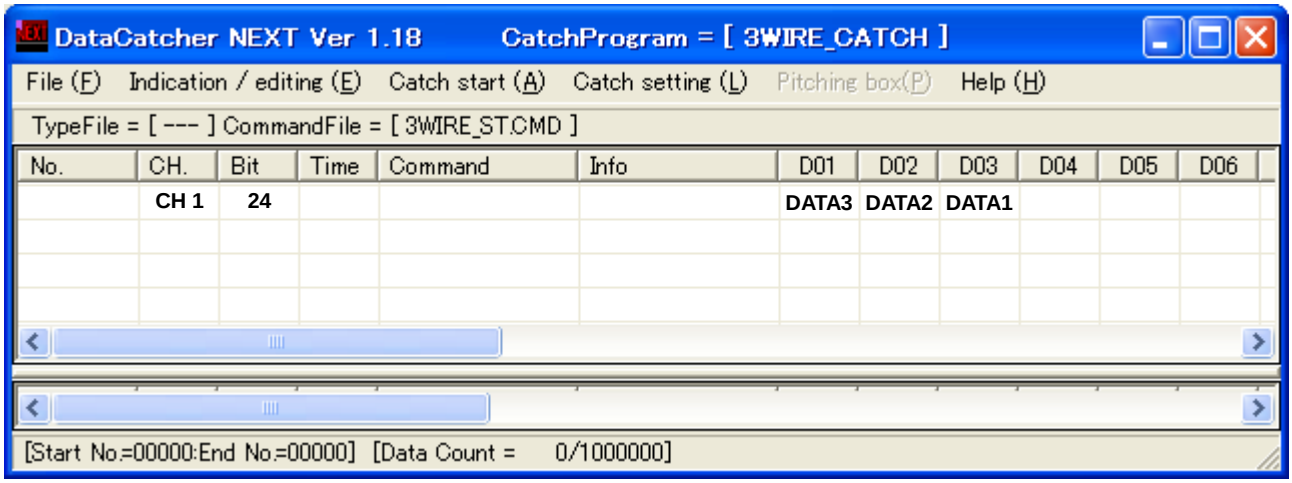
The display turn of catch data is set up.



The following screen shows case that turned on [In order of catched time] option button.



The following screen shows case that turned on [In order of near STB (latch)] option button.



[Do you invert the logic of catch data?]

Select the logic inverted or not.

[All the catch data at the time of [0]]

The processing method of case that all the data of communication packet were 0 is set up.

[All the catch data at the time of [1]]

The processing method of case that all the data of communication packet were 1 is set up.

[In data decision other channel data?]

A certain channel sets up it about the processing method of the data that received it with other channels in the time that settled communication packet, in middle that is receiving communication data.

* Please refer to “Restriction”.

[Max catch data]

<Max Length>

The number of the DATA line that is displayed to the screen is set up.

When Max Length is set up with 10 D01-D10 is displayed to the DATA line. MAX value is 32.

Please set up it short than " Max catch data of each channel " of page before.

[If I caught a max byte?]

You can set up it about the processing method of case that received the data number that set up it with "Max catch data".

- On of " Discard the data from older data " the option button
  This receives it while discarding old data until communication packet settles.

- On of " Set the data as a continuation handling " the option button
  This receives all the data, until communication packet is settled.
  If the byte number of communication data, becomes "Max catch data"
  that designated the data to there is displayed.
  The data after that continuously displays it as data.
  The following item sets up it about the condition that settles communication packet.

[It is decided that it is data to point out a last byte]

In the case that there is the data that shows the final byte the value of 0x00h-0xffh is set up.
Also, off is set up in the case that there is not the data that shows the final byte.

[It is decided that it is time after 1 byte receipt of a message]

Communication packet is settled in the time between BYTE.
As for the setting value, the selection is possible among 001-100 and the unit is msec.
When "off" was selected this setting becomes ineffective.

[There is a byte to appoint length]

The data that designates the length of communication packet sets up this to be included to communication packet.

-The several byte :

In the case that the data that designates the length of communication packet is included the position of the data is set up.
This value is to 01-32.
When "off" was selected this setting becomes ineffective.

-Revision :

For example the revision value is set up, in the case that the data of the position that the data of STX and ETX are included in communication packet and set up in the above does not include STX and ETX.
This value is to 01-32.
In the case that there is not revision data 00 are set up.

[There is a byte to let length settle]

In the case that the data that settles the length of communication packet is included the position of the data is set up.
This value is to 01-32.
When "off" was selected this setting becomes ineffective.
The length of the communication packet corresponding to this data corresponds it like the next page by the type file.(The example of the next page is case with regard to channel 1)
For example, and the value (the position of data) "18" are set up and please edit as follows, to set up the length of communication packet with 16Byte. (Matrix form)

-Actual file contents-

```
CH1_COMMAND_STB=00
; : 00 01 02 03 04 05 06 07 08 09 0a 0b 0c 0d 0e 0f
$00=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$10=00,00,10,00,00,00,00,00,00,00,00,00,00,00,00,00
$20=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$30=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$40=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$50=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$60=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$70=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$80=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$90=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$a0=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$b0=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$c0=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$d0=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$e0=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$f0=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
```

[Editing of the type file]

The type file is opened with a/the text editor. Please use it in the case that a direct type file is edited.
The contents that changed it with channel setting window click "OK" the button once, in the case that they were already done a change, because they are not written in the file until they preserve the type file and choose from "File" the menu "TYPE file save" and please do type file editing once again, after they preserved it.

By clicking this button the following information window opens.

DataCatcher NEXT Ver 1.18
TYPE FILE OPEN [C:¥Program Files¥HeartLandData¥DC NEXT¥LIB¥3WIRE_ST.TYP]
Open after I spare it in the case that already THE [TYPE FILE] is edited!
OK
キャンセル

12-3: Connector List

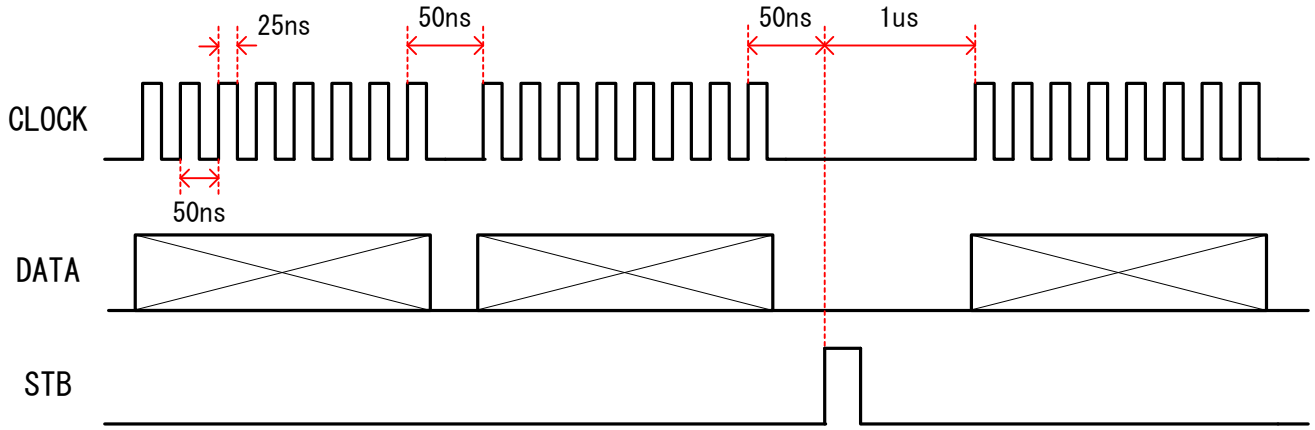
Ch No	Pin No	Name	Contents
1	1	CH1_CLK	CH1 CLOCK signal input.
	2	CH1_DATA	CH1 DATA signal input.
	4	CH1_STB	CH1 DATA fix signal input.
2	5	CH2_CLK	CH2 CLOCK signal input.
	6	CH2_DATA	CH2 DATA signal input.
	8	CH2_STB	CH2 DATA fix signal input.
3	9	CH3_CLK	CH3 CLOCK signal input.
	10	CH3_DATA	CH3 DATA signal input.
	12	CH3_STB	CH3 DATA fix signal input.
	47	EVENT	Event signal output by setting of Event filter.
	48	TRIG	External trigger input.

CAUTION:

- Connect target GND with DC NEXT board GND.
  Please ground even so the catch data is unsteady.
- Power DC NEXT before connecting probe with communication line. If not, it cause of trouble.
- Need to connect each CLOCK input with target CLOCK signal when multi channel data catching.

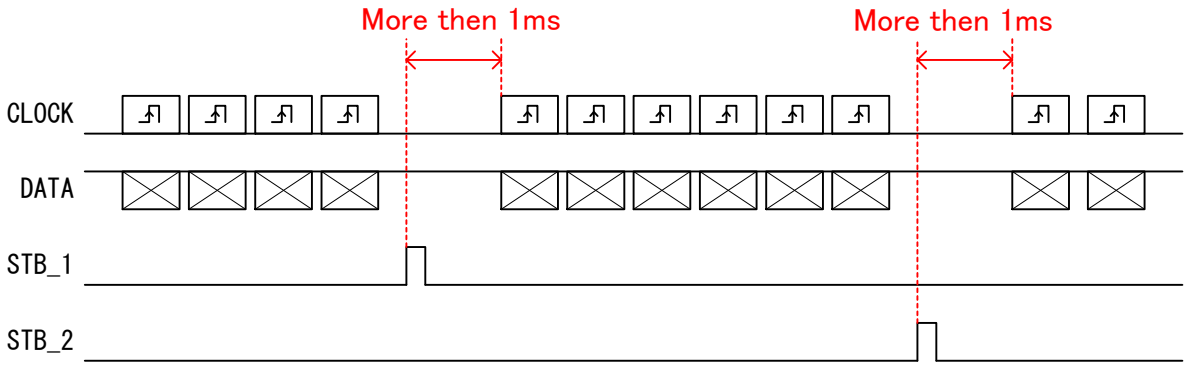
12-4: Restrictions

The highest frequency of a reception possible clock	20MHz
Such time when the STB signal occurs and the next clock become possible and receive	1usec
One byte reception after, the next clock such time when becomes possible and receives	50nsec



* CLOCK edge is delayed internally when [Choice of CLOCK frequency bgand] and [DELAY TIME] are used at the same time.
Since the data catch timing depends on the setting value, unsuitable setting may delay the timing, and then the catch data is not shown correctly.

- Feature : Clear another channel data when data is fixed.

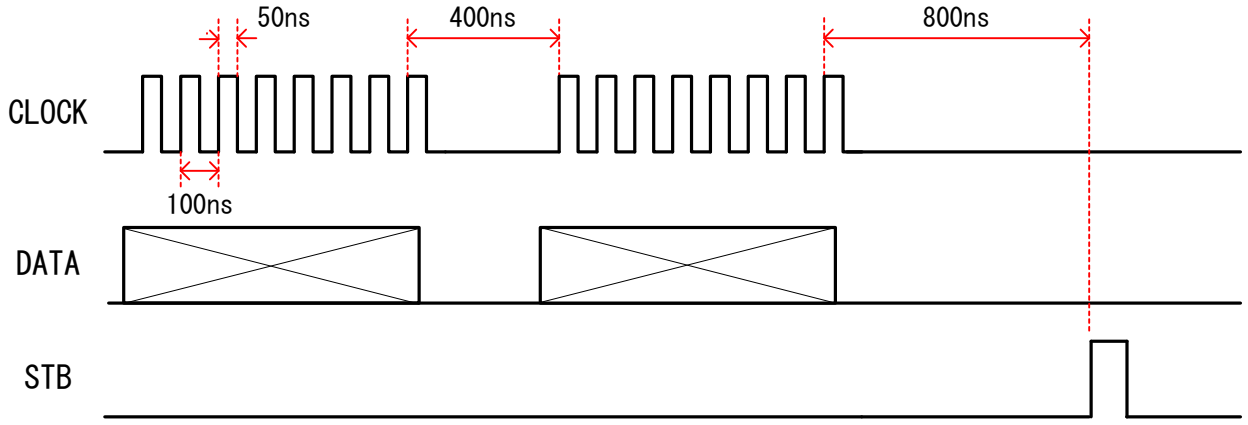


- Needed over 1msec in upper case from packet data fixing to next clock signal.

13. Signal that is able to transmit with [3WIRE_PITCH]Program

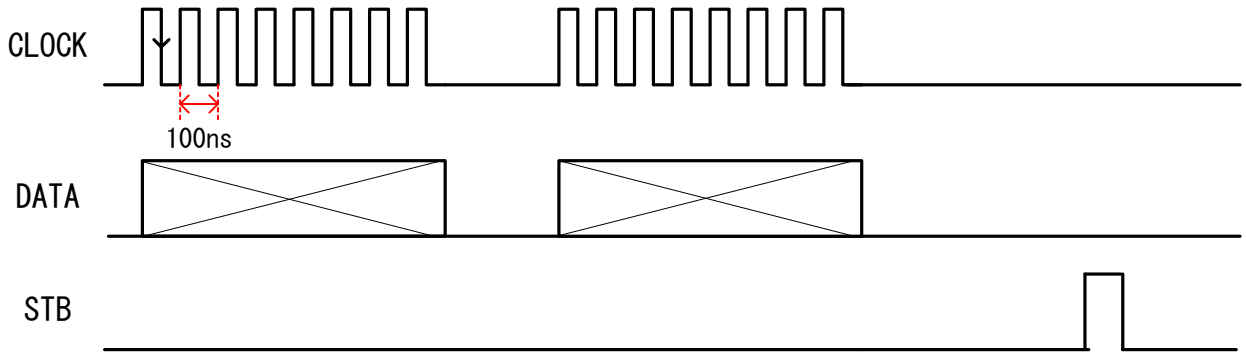
13-1: Supporting Signal <3Wire>

EX. CLK=10MHZ

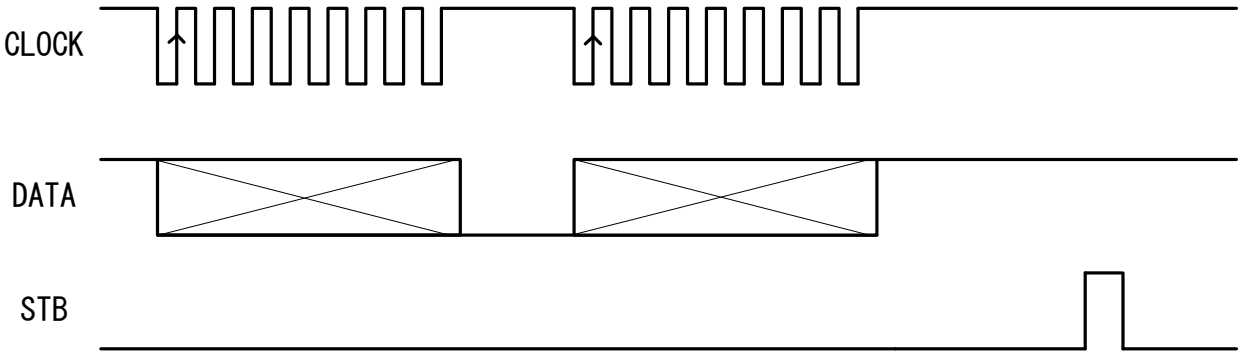


- Enable CLOCK frequency : 100KHz/500KHz/1MHZ/5MHz/10MHz.
- Needed 4 clocks wait time from 1Byte transmitred to next CLOCK pulse.
- Needed 8 clocks wait time of selected frequency from last CLOCK pulse to STB edge.

EX1. DEFAULT : LOW／CLOCK_EDGE : LOW／DATA_ACTIVE : LOW／STB : HI



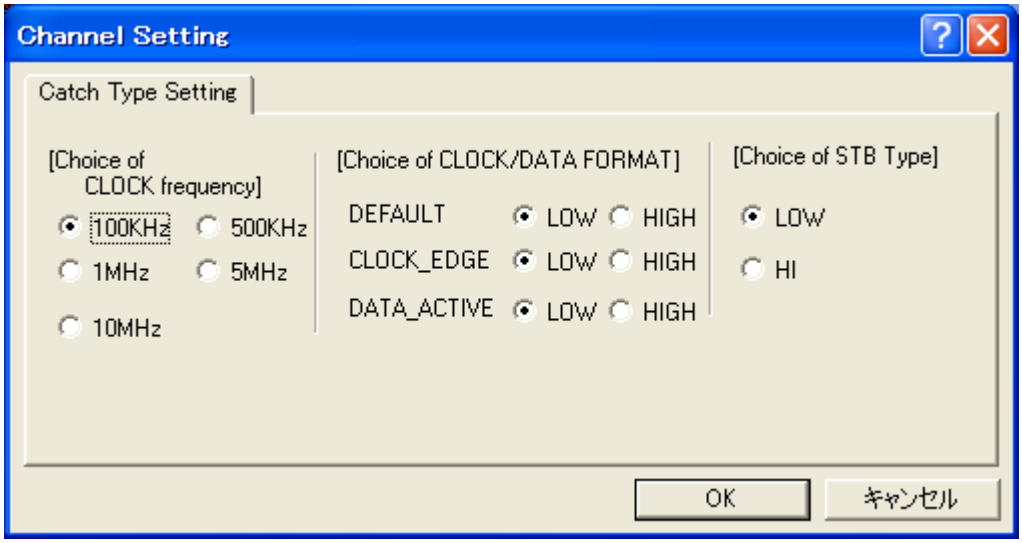
EX2. DEFAULT : HI／CLOCK_EDGE : HI／DATA_ACTIVE : HI／STB : HI



14. The Setting of [3WIRE_PITCH]Program

14-1:〈Catch Type Setting〉 the setting contents in this tag

By clicking [Catch setting (L)]-[Catch type setting (P)] the < Channel Setting > dialog box is shown.
Please set the 3WIRE send data. Please set up it in accordance with the following explanation.



[Choice of CLOCK frequency]
Select CLOCK frequency

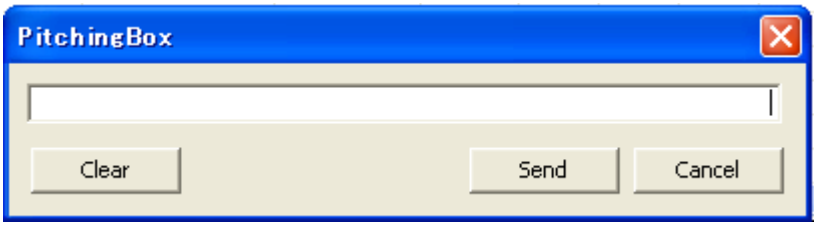
[Choice of CLOCK/DATA FORMAT]
<DEFAULT> Select the default CLOCK setting.
<CLOCK_EDGE> Select the signal edge of Latch.
<DATA_ACTIVE> Select the active statement of DATA signal.

[Choice of STB Type]
Select the type of STB signal.

14-2:Functions

- Enable to transmit 1packet data frexibly during data catch.
- Enable to transmit max data length.
- Enable to set transmitring format CLOCK frequency,

14-3: The Setting of Pitching Box <Transmitting Data Format>



・Max length of text is 32 charactors, 16Bytes.
・Please input the data as HEX.
NOTE : Enable charactors are ”0”-”9”, “A”-“F”. 32 charactors.

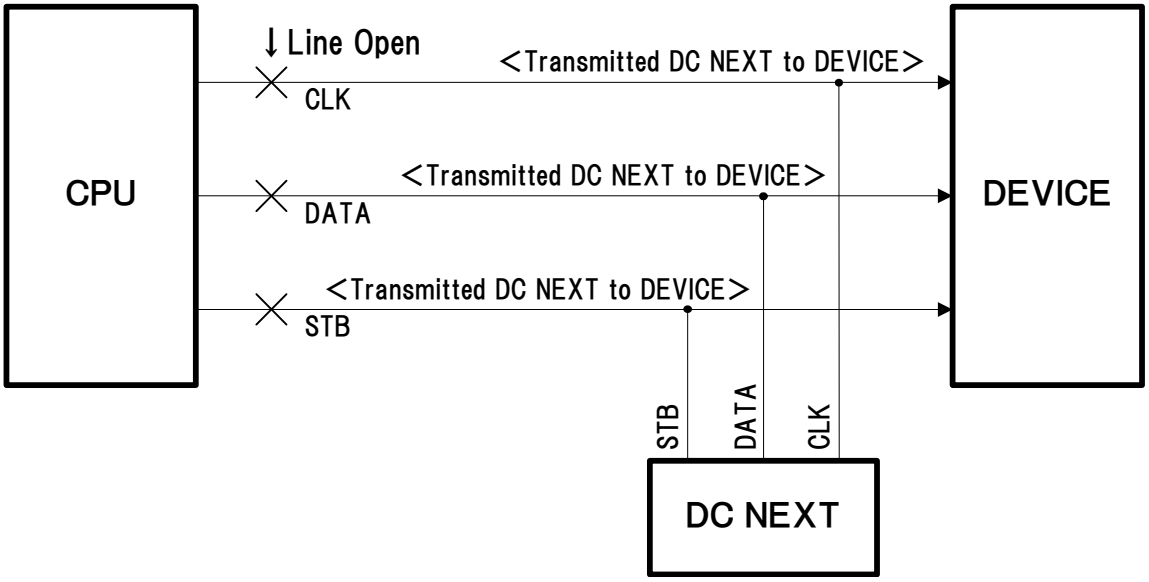
14-4: Basic Operation

1. Connect the prove with 3wire line on target board.
   Please refer to ”14-5 : Connector List ”
2. The window “Pitching box” is opened after click [Catch Start(A)]-[Pitching box(P)].
3. Input the transmit data in text box by HEX. Max 16 bytes.
   Enable charactors are ”0”-”9”, ”A”-”F”. 32 charactors.
4. Transmit the data by click [Send] bottun.
5. Clear the data by click [Clear] bottun.
6. Close the “Pitching Box” window by click [Cancel] bottun.

14-5: Connector List

Ch No	Pin No	Name	Contents
1	29	CLK	CH1 CLOCK signal output.
	30	DATA	CH1 DATA signal output.
	32	STB	CH1 DATA fix signal output

Please modify your target board like below when DC NEXT is connected with target.



CAUTION:

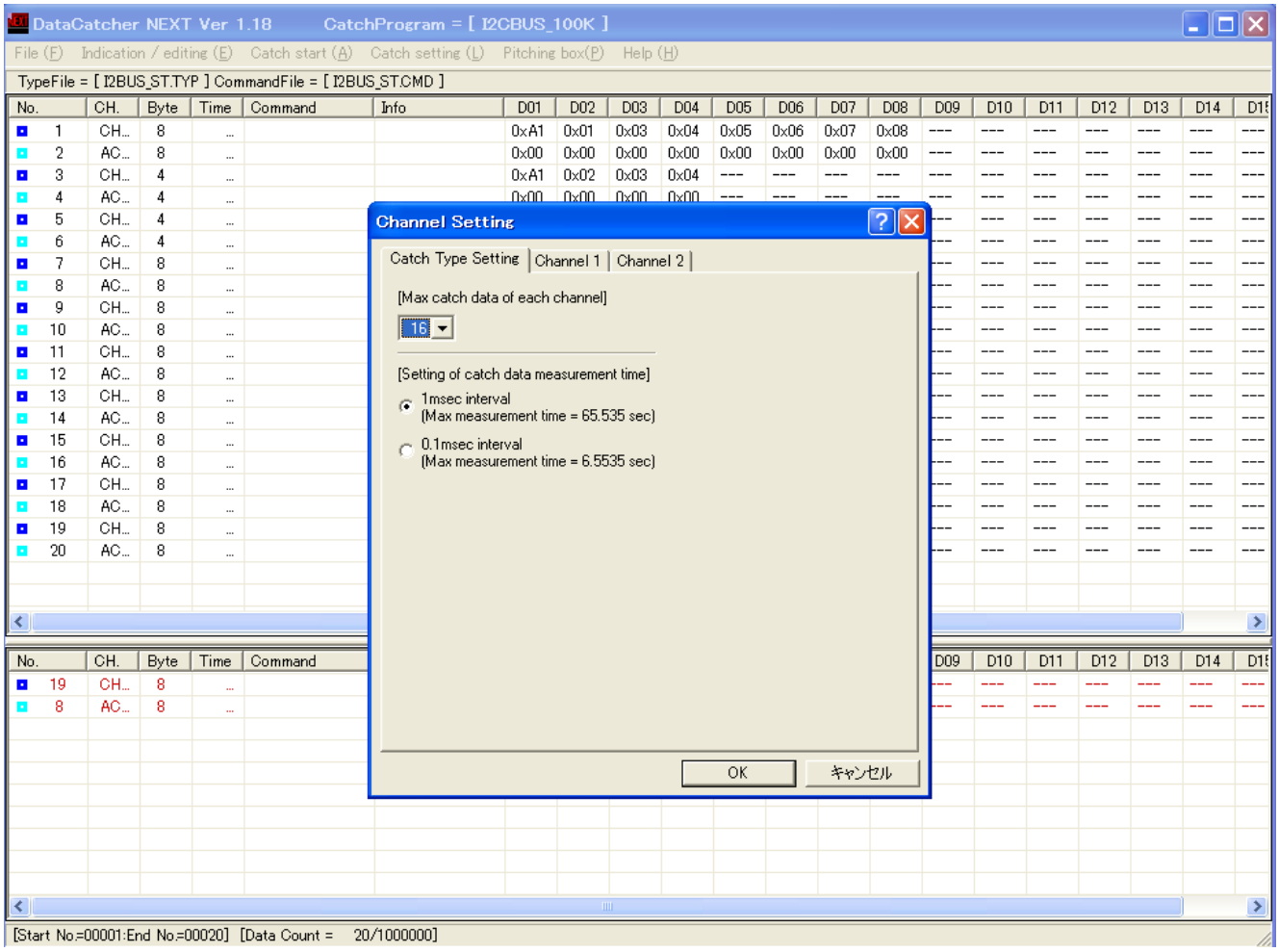
- When you connect Pitch CH prove with transmit line on target board, change the statement of communication line to High impedance, then send the data to DEVICE slave
- Do not send the data during Low impedance.
- Please make sure to be provided power for DC NEXT. Then connect the prove

14-6: Restrictions

- Disable to select PitchngBox by catch start.
- Disable to select items of [File (F)] menu without [Catch program change (N)] and [Exit (X)].
- Disable to select the setting of [Indication/editing (E)].
- Disable to select items of [File (F)] menu without [Catch type setting].

15. The Setting of [I2CBUS_100K/400K]Catch Program

By clicking [Catch setting (L)]-[Catch type setting (P)] the < Channel Setting > dialog box can open.
Please do the setting with regard to the I2C communication.
Please set up it in accordance with the following explanation.


DataCatcher NEXT Ver 1.18
CatchProgram = [I2CBUS_100K]
File (F) Indication / editing (E) Catch start (A) Catch setting (L) Pitching box(P) Help (H)
TypeFile = [I2BUS_ST.TYP] CommandFile = [I2BUS_ST.CMD]
Channel Setting
Catch Type Setting
Channel 1
Channel 2
[Max catch data of each channel]
16
[Setting of catch data measurement time]
1msec interval
(Max measurement time = 65.535 sec)
0.1msec interval
(Max measurement time = 6.5535 sec)
OK
キャンセル
[Start No.=00001:End No.=00020] [Data Count = 20/1000000]

15-1:<Catch Type Setting〉The setting contents in this tag

[Max catch data of each channel]

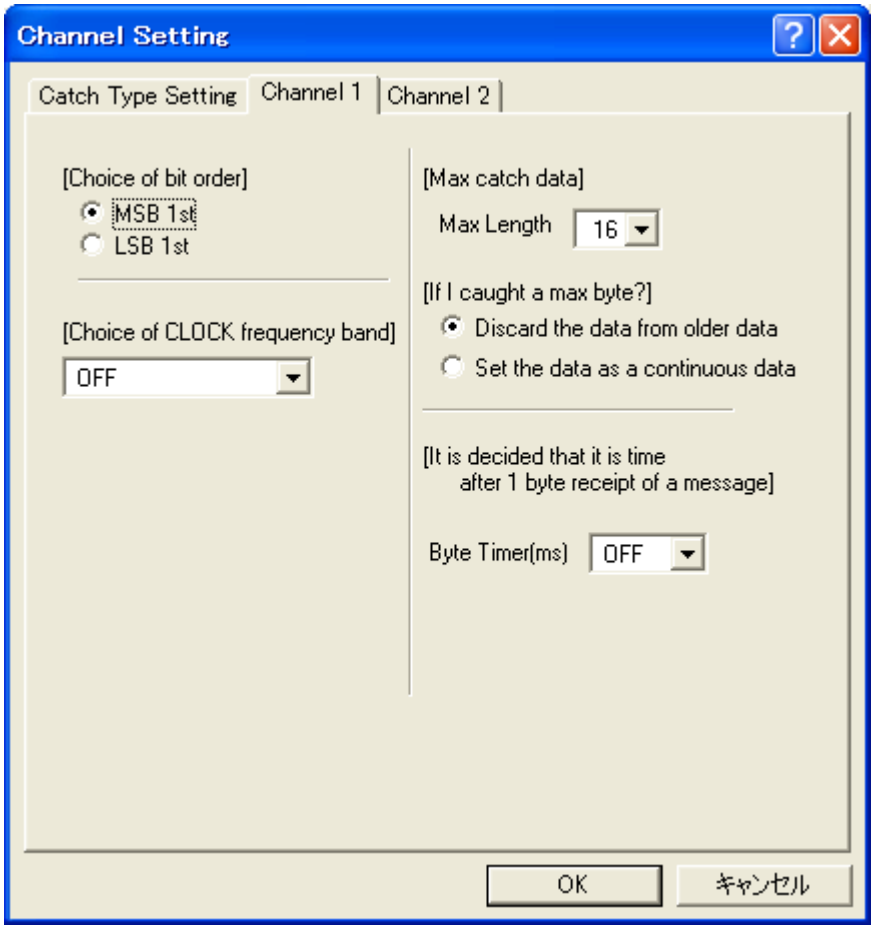
<Max Length>

The number of the DATA line that is displayed to the screen is set up.
When Max Length is set up with 10 D01-D10 is displayed to the DATA line.
MAX value is 32.

[Setting of catch data measurement time]

Data catcher measures the time from the settlement of the settlement to, present communication packet of the communication packet of before and display.
You can set up the resolution in measuring time.

15-2: <Channel1><Channel2> The setting contents in this tag



[Choice of Bit order]

Select serial transmit method..

[Choice of CLOCK frequency band]

Select CLOCK frequency band of communication signal.
Enable to catch although select [OFF].
Enable to catch tolerably for blunt Hi/Low edge.
* When DC NEXT cannot catch target signal, please use this one.

[Max Catch Data]

<Max Length>
The number of the DATA line that is displayed to the screen is set up.
When Max Length is set up with 10 D01-D10 is displayed to the DATA line.
MAX value is 32.

[If I caught a Max byte?]

You can set up it about the processing method of case that received the data number that set up it with "Max catch data".

- On of " Discard the data from older data " the option button

This receives it while discarding old data until communication packet settles.

- On of " Set the data as a continuous data " the option button

This receives all the data, until communication packet is settled.
If the byte number of communication data, becomes "MAX catch data"
that designated the data to there is displayed.
The data after that continuously displays it as data.

[It is decided that it is time after 1 byte receipt of a message]

Communication packet is settled in the time between BYTE.
As for the setting value, the selection is possible among 001-100 and the unit is msec.
When "off" was selected this setting becomes ineffective.

15-3: Conector List

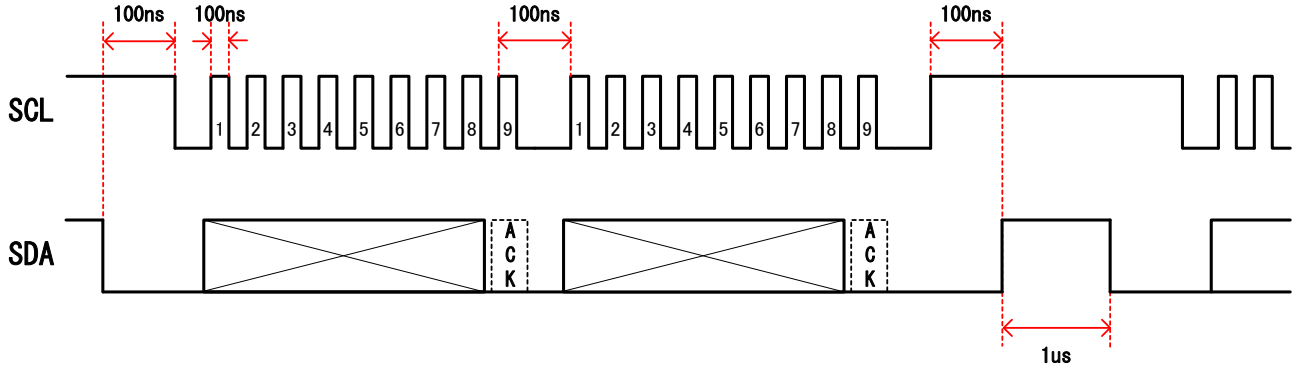
Ch No	Pin No	Name	Contents
1	1	CH1_SCL	CH1 CLOCK signal input.
	2	CH1_SDA	CH1 DATA signal input.
2	3	CH2_SCL	CH2 CLOCK signal input.
	4	CH2_SDA	CH2 DATA signal input.
	47	EVENT	Event signal output by setting of Event filter.
	48	TRIG	External trigger input.

CAUTION:

- Connect target GND with DC NEXT board GND.
  Please ground even so the catch data is unsteady.
- Power DC NEXT before connecting probe with communication line. If not, it cause of trouble.
- Need to connect each CLOCK input with target CLOCK signal when multi channel data catching.

15-4: Restrictions

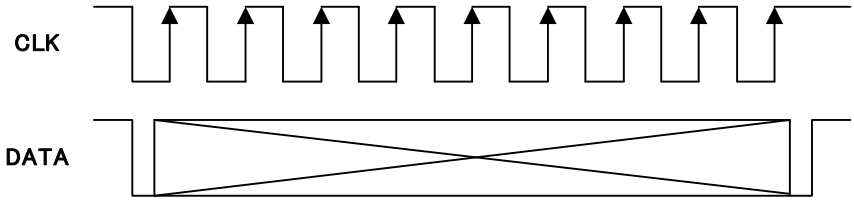
The highest frequency of a reception possible clock	4MHz
Such time when stop condition occurs and the next clock become possible and receive	1usec
One byte reception after, the next clock such time when becomes possible and receives	100nsec



* CLOCK edge is delayed internally when [Choice of CLOCK frequency band] and 【DELAY TIME】 are used at the same time.
Since the data catch timing depends on the setting value, unsuitable setting may delay the timing, and then the catch data is not shown correctly.

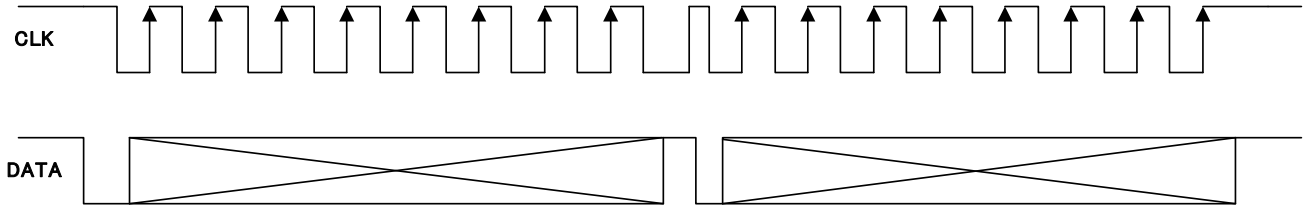
16. Signal that is able to catch with [I2CBUS_100K/400K]Catch Program

16-1: Type that "start condition" and "end condition" is a pair



Please use 2 channels, to monitor 2 bus lines.

16-2: Type with the restart between "start condition" and "end condition"

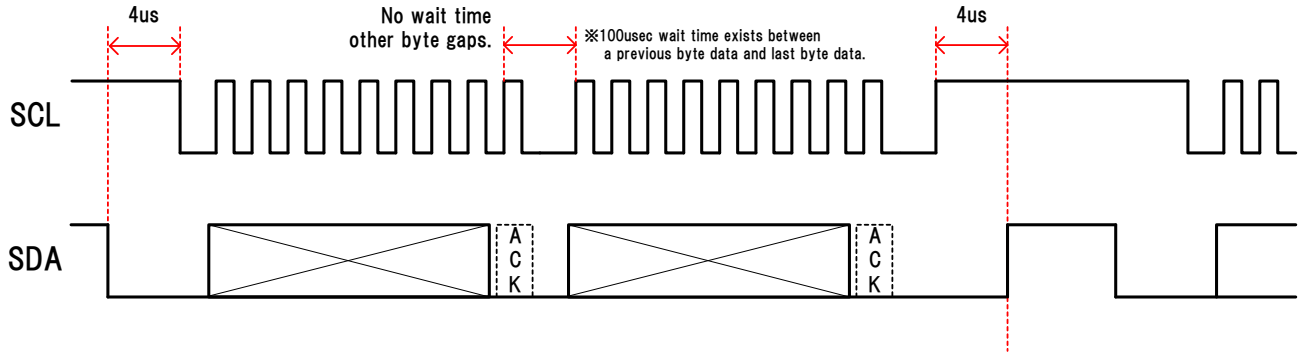


Please use 2 channels, to monitor 2 bus lines.

* Difference of I2CBUS_100K/400K.
  - Spec for Catching is same.
  - Spec for Pitching is not same.
    Frequency of transmitable signal is not same 100KHz and 400KHz.

17. Signal that is able to transmit with I2S Pitching Function

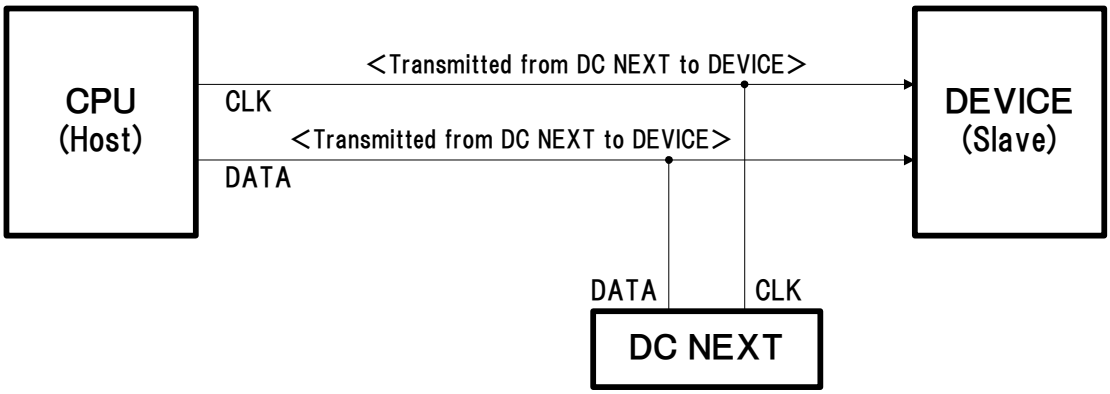
17-1: Supporting Waveform < I2C >



- Transmitable frequency : 100KHz / 400KHz.
- Hold time of Start Condition : over 4usec.
- 100usec wait time exists between a previous byte data and last byte data.
  No wait time other byte gaps.
- Hold time of Stop Condition : over 4usec.

17-2: Connection Method < I2C >

Please modify your target board like below when DC NEXT is connected with target.



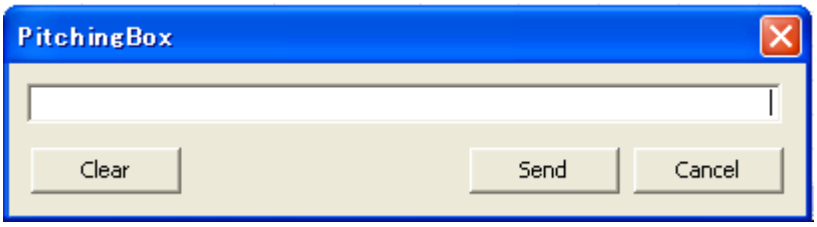
18. The Setting of I2C_BUS Pitching Function

Following window is shown after click [Catch start(A)]-[Pitching box(P)].
Enable to set the transmitring I2C data.

18-1: Functions

- Enable to transmit 1packet data any timing during catching.
- Enable to transmit max 16 byte as 1 packed.
- Enable to select CLOCK frequency 100KHz/400KHz. Please select it at CatchProgram.
- Transmit format : Start condition + any data + Stop condition.

18-2: The Setting of Pitching Box<Transmit Data Format>



- No needed tag setting for I2C pitching.
- Enable to input max character number is 32(16bytes).
- Numeric : HEX fotmat. “0” - “9”, “A” - "F”.

18-3: Basic Operation

1. Connect DC NEXT probe with target I2CBUS.
   Please refer to [18-4:Connector List].
2. The window “Pitching box” is opened after click [Catch Start(A)]－[Pitching box(P)].
3. Input the transmit data in text box by HEX. Max 16 bytes.
   Enable charactors are ”0”-“9”, “A”-“F”.　32 charactors.
4. Transmit the data by click [Send] bottun.
5. Clear the data by click [Clear] bottun.
6. Close the “Pitching Box” window by click [Cancel] bottun.

18-4: Connector List

Ch No	Pin No	Name	Contents
1	45	SCL	CH1 CLOCK signal output.
	46	SDA	CH1 DATA signal output.

CAUTION:

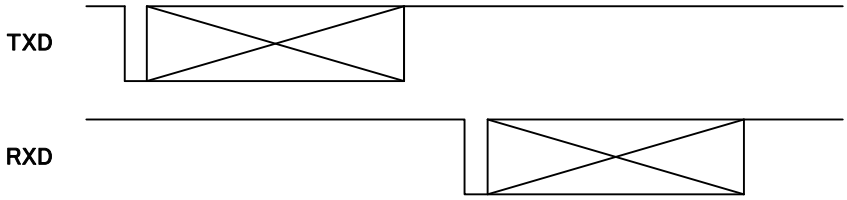
- When you connect Pitch CH prove with transmit line on target board, change the statement of communication line to High impedance, then send the data to DEVICE slave
- Do not send the data during Low impedance.
- Please make sure to be provided power for DC NEXT. Then connect the prove

18-5: Restrictions

- Disable to select PitchngBox by catch start.
- When DC NEXT(Host) transmit the 1 packet data, it deems communication error if NACK, and then transmit Stop Condition.
- Not supported Re-Start signal.

19. Signal that is able to catch with [UART] Catch Program

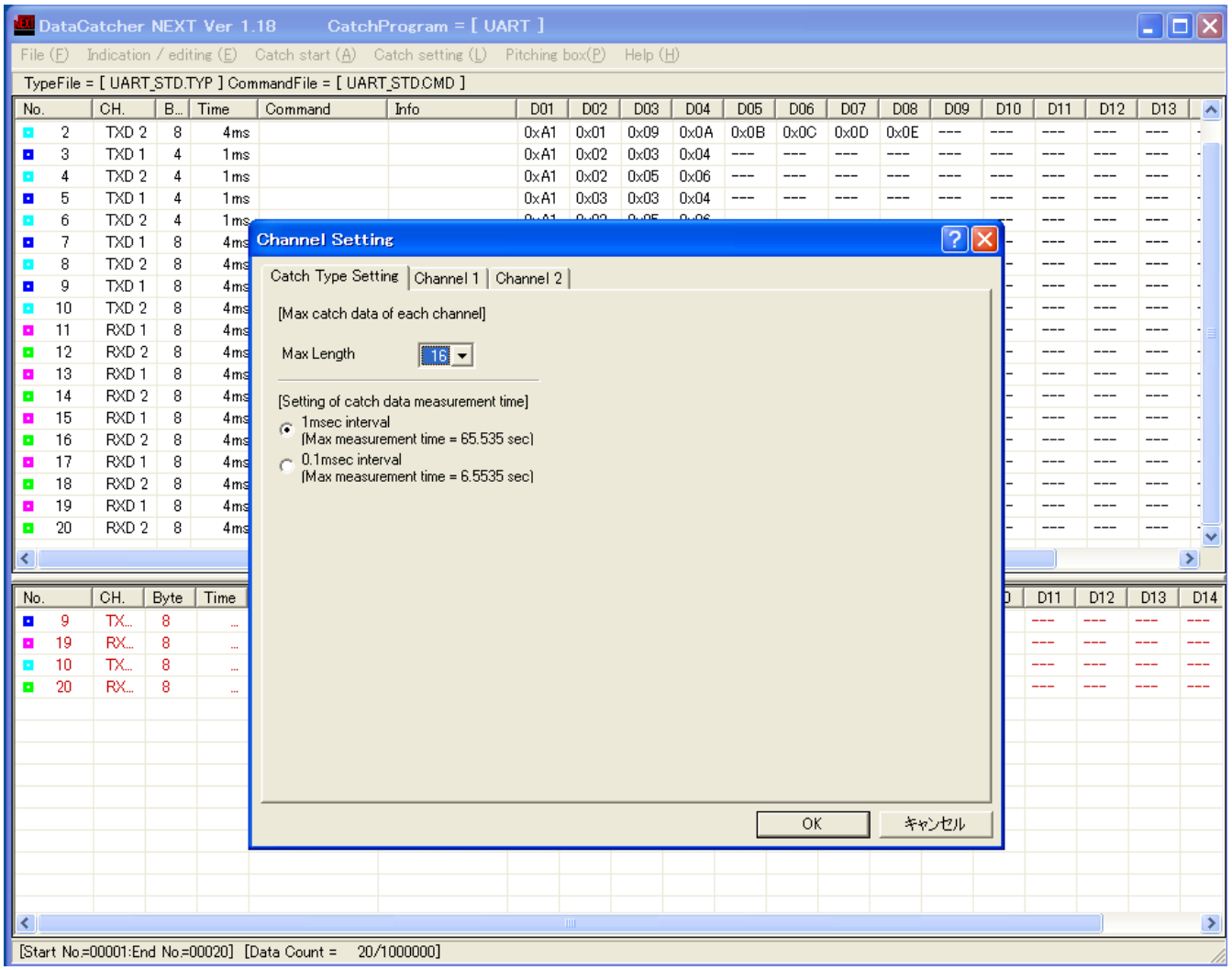
19-1: Low active signals



This is the communication method in a CPU and Device driver period.
By using 2 channels 2 communication lines can be received.
The catch to 921600bps is possible.

20. The Setting of [UART]Catch Program

By clicking [Catch setting (L)]-[Catch type setting (P)] the < Channel Setting > dialog box can open.
Please do the setting with regard to the UART communication.
Please set up it in accordance with the following explanation.


DataCatcher NEXT Ver 1.18
CatchProgram = [UART]
File (F) Indication / editing (E) Catch start (A) Catch setting (L) Pitching box(P) Help (H)
TypeFile = [UART_STD.TYP] CommandFile = [UART_STD.CMD]
Channel Setting
Catch Type Setting
Channel 1
Channel 2
[Max catch data of each channel]
Max Length
16
[Setting of catch data measurement time]
1msec interval
[Max measurement time = 65.535 sec]
0.1msec interval
[Max measurement time = 6.5535 sec]
OK
キャンセル
[Start No.=00001:End No.=00020] [Data Count = 20/1000000]

20-1:<Catch Type Setting> The setting contents in this tag

[Max catch data of each channel]

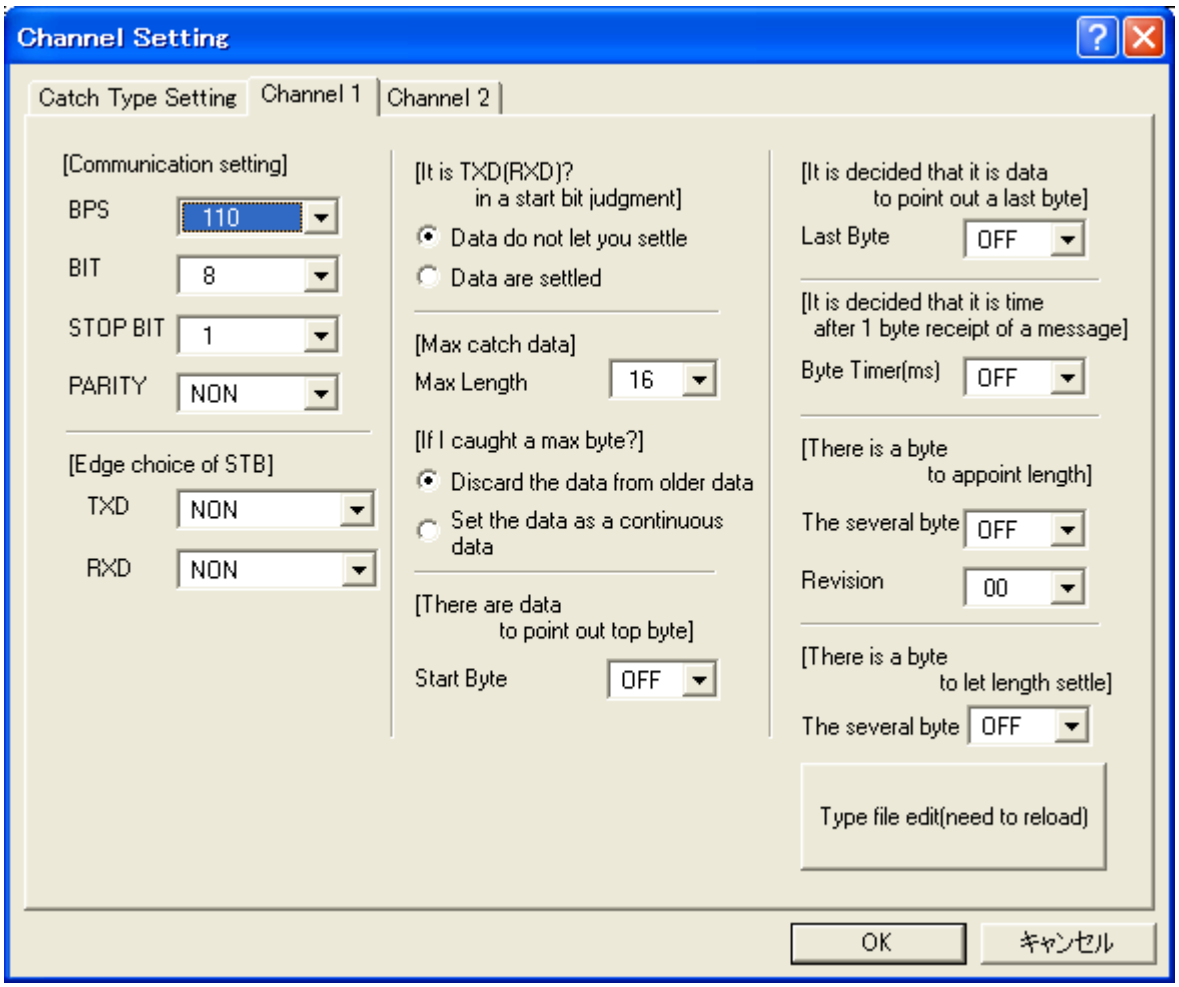
<Max Length>

The number of the DATA line that is displayed to the screen is set up.
When Max Length is set up with 10 D01-D10 is displayed to the DATA line.
MAX value is 32.

[Setting of catch data measurement time]

Data catcher measures the time from the settlement of the settlement to, present communication packet of the communication packet of before and display.
You can set up the resolution in measuring time.

20-2: <Channel1><Channel2> The setting contents in this tag



[Communication setting]

<BPS> Communication speed is set up.
<BIT> Bit number is set up.
<STOP BIT> Length of STOP BIT is set up.
<PARITY> PARITY BIT is set up.

[Edge choice of STB]

<TXD> Please set up EDGE of TXD.
<RXD> Please set up EDGE of RXD.
* Please refer to Restriction.

[It is TXD(RXD) ? in a start bit judgment]

Please set up it about the processing method of the data in the catch in the time that the start bit of the other side is received, to middle that is receiving the data of TXD or RXD already.
* Please refer to Restriction.

[Max catch data]

<Max Length>
The number of the DATA line that is displayed to the screen is set up.
When Max Length is set up with 10 D01-D10 is displayed to the DATA line.
MAX value is 32.

Please set up it short than "Max catch data " of page befor.

[If I caught a best byte?]

You can set up it about the processing method of case that received the data number that set up it with " Max catch data ".

- On of " Discard the data from older data " the option button
  This receives it while discarding old data until communication packet settles.
- On of " Set the data as a continuous data " the option button
  This receives all the data, until communication packet is settled.
  If the byte number of communication data, becomes " Max catch data "
  that designated the data to there isdisplayed.
  The data after that continuously displays it as data.

[There are data to point out top byte]

In the case that there is the data that shows the top byte the value of 0x00h-0xffh is set up.
Also, off is set up in the case that there is not the data that shows the top byte.

[It is decided that it is data to point out a last byte]

In the case that there is the data that shows a/the final byte the value of 0x00h-0xffh is set up.
Also, off is set up in the case that there is not the data that shows the final byte.

[It is decided that it is time after 1 byte receipt of a message]

Communication packet is settled in the time between BYTE.
As for the setting value, the selection is possible among 001-100 and the unit is msec.
When "off" was selected this setting becomes ineffective.

[There is a byte to appoint length]

The data that designates the length of communication packet sets up this
to be included to communication packet.

-The several byte :
  In the case that the data that designates the length of communication
  packet is included the position of the data is set up.
  This value is to 01-32.
  When "off" was selected this setting becomes ineffective.

-Revision :
  For example the revision value is set up, in the case that the data of the position
  that the data of STX and ETX are included in communication packet
  and set up in the above does not include STX and ETX.
  This value is to 01-32. In the case that there is not revision data 00 are set up.

[There is a byte to let length settle]

In the case that the data that settles the length of
communication packet is included the position of the data is set up. This value is to 01-32.
When "off" was selected this setting becomes ineffective.
The length of the communication packet corresponding to this data corresponds it like the next page by the type file.(The example of the next page is case with regard to channel 1)
For example, and the value (the position of data) "18" are set up and please edit as follows, to set up the length of communication packet with 16Byte. (Matrix form)

-Actual file contents-

```
CH1_COMMAND_STB=00
; : 00 01 02 03 04 05 06 07 08 09 0a 0b 0c 0d 0e 0f
$00=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$10=00,00,10,00,00,00,00,00,00,00,00,00,00,00,00,00
$20=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$30=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$40=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$50=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$60=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$70=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$80=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$90=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$a0=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$b0=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$c0=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$d0=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$e0=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$f0=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
```

[Editing of the type file].

The type file is opened with a/the text editor.
Please use it in the case that a direct type file is edited.
The contents that changed it with channel setting window click "OK" the button once,
in the case that they were already done a change,
because they are not written in the file until they preserve the type file
and choose from "File" the menu "TYPE file save"
and please do type file editing once again, after they preserved it.
By clicking this button the following information window opens

DataCatcher NEXT Ver 1.18
TYPE FILE OPEN [C:¥Program Files¥HeartLandData¥DC NEXT¥LIB¥UART_STD.TYP]
Open after I spare it in the case that already THE [TYPE FILE] is edited!
OK
キャンセル

20-3: Connector List

Ch No	Pin No	Name	Contents
1	1	TXD1	CH1 TXD signal. * Please connect with GND if not use.
	2	RXD1	CH1 RXD signal. * Please connect with GND if not use.
2	3	TXD2	CH2 TXD signal. * Please connect with GND if not use.
	4	RXD2	CH2 RXD signal. * Please connect with GND if not use.
1	5	TXD1-STB	CH1 TXD fixed signal.
	6	RXD1-STB	CH1 RXD fixed signal.
2	7	TXD2-STB	CH2 TXD fixed signal.
	8	RXD2-STB	CH2 RXD fixed signal.
	47	EVENT	Event signal output by setting of Event filter.
	48	TRIG	External trigger input.

CAUTION:

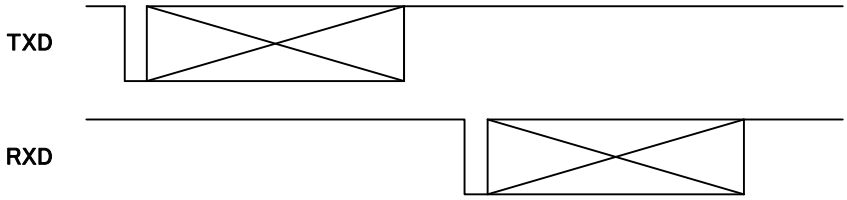
- Connect target GND with DC NEXT board GND.
  Please ground even so the catch data is unsteady.
- Power DC NEXT before connecting probe with communication line. If not, it cause of trouble.
- Connect not used channel in TXD1/2 or RXD1/2 with GND.

20-4: Restrictions

- "FULL" message is shown on the channel display on log window when lossed data.
  Regarding over 230400bps communication, it would be easily FULL.
  It may prevent by inserting over 1msec wait time between packet and packet.
- Not to keep TXD/RXD input line Low lebel during catch after detected Start Bit.
  DC NEXT cannot catch the data during input lines Low.

21. Signal that is able to transmit with UART Pitching Function

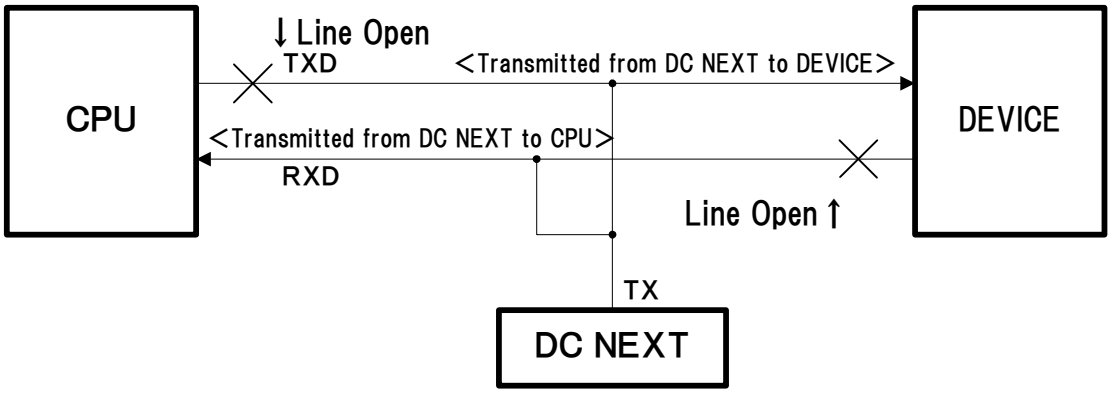
21-1: Low active signals



This is for communication configuration maily between CPU and DEVICE.
Enable to pitch the data on 1channel by using 1port.
Supported max communication rate 921600 BPS.

21-2: Connection Method

Please modify your target board like below when DC NEXT is connected with target.



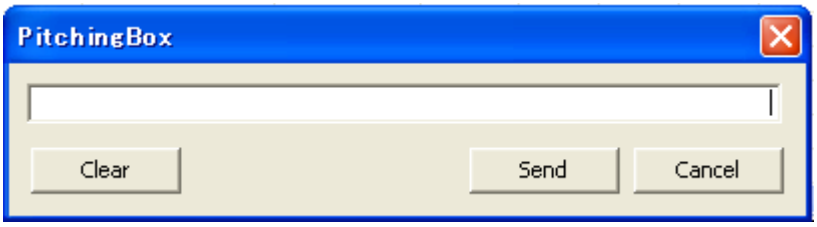
22. The Setting of I2C_BUS Pitching Function

Following window is shown after click [Catch start(A)]－[Pitching box(P)].
Enable to set the transmitring UART transmiting data.

22-1: Functions

- Enable to transmit 1packet data any timing during catching.
- Enable to transmit max 16 byte as 1 packed.
- Communication setting for CH1 is reflected in transmitring format.
  BPS/BitNumber/STOP/ParityBit.

22-2: The Setting of Pitching Box<Transmit Data Format>



- CH1 setting is reflected in tag.
  Setting are four items : BPS/BitNumber/STOP/ParityBit.
  Please refer to "20-2 : <Channel1><Channel2> The setting contents in this tag ".
- Max length of text is 32 charactors, 16Bytes.
- Please input the data as HEX.
  NOTE : Enable charactors are "0"-"9", "A"-"F". 32 charactors.

22-3: Basic Operation

1. Connect DC NEXT probe with target UART BUS.
   Please refer to [22-4 : Connector List].
2. The window "Pitching box" is opened after click [Catch Start(A)]－[Pitching box(P)].
3. Input the transmit data in text box by HEX. Max 16 bytes.
   Enable charactors are "0"-"9", "A"-"F". 32 charactors.
4. Transmit the data by click [Send] bottun.
5. Clear the data by click [Clear] bottun.
6. Close the "Pitching Box" window by click [Cancel] bottun.

22-4: Connector List

Ch No.	Pin No.	名　称	内　　容
1	29	TX-CH1	CH1 TX output.

CAUTION:

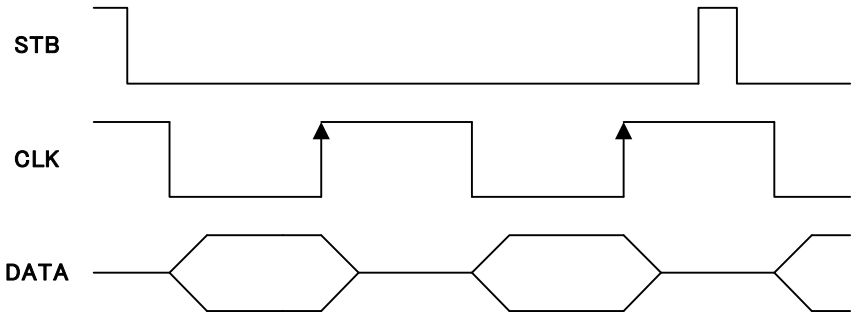
- When you connect Pitch CH prove with transmit line on target board, change the statement of communication line to High impedance, then send the data to DEVICE slave
- Do not send the data during Low impedance.
- Please make sure to be provided power for DC NEXT. Then connect the prove

22-5: Restrictions

- Disable to select PitchngBox by catch start.

23. Signal that is able to catch with [PARA_CATCH] Catch Program

23-1：Parallel communication 16Bit DATA width signals

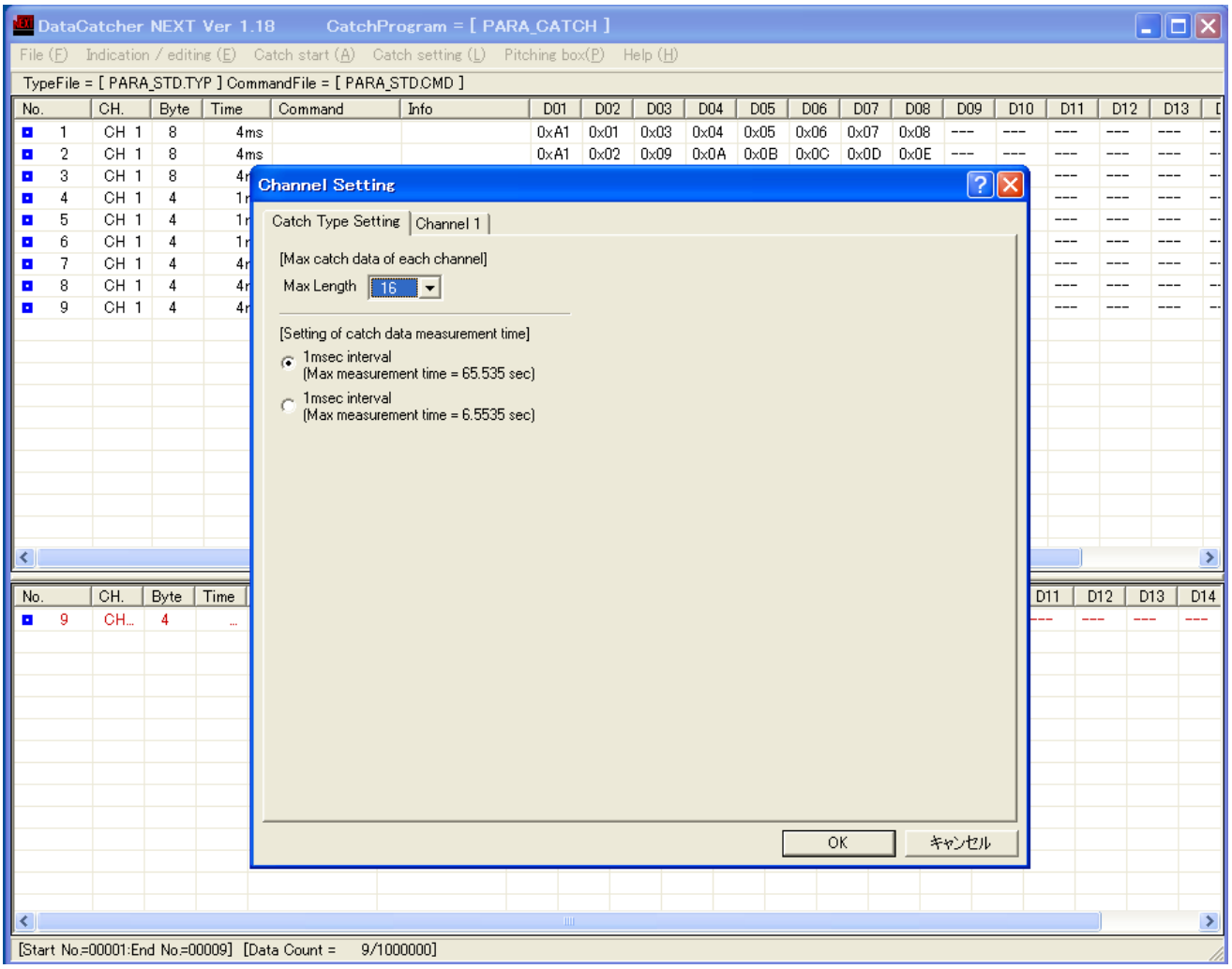


There is a STB signal general "Parallel communications",
the catch is possible regarding the type that there is not a STB signal.

- Form that settles communication packet in the time between Byte.
- Form with the data that designates the length of communication packet into communication data.
- Form with the data that instructs the completion of communication packet.
- Form with the data that settles the length of communication packet.

24. The Setting of [PARA_CATCH]Catch Program

By clicking [Catch setting (L)]-[Catch type setting (P)] the < Channel Setting > dialog box can open.
Please do the setting with regard to the UART communication.
Please set up it in accordance with the following explanation.


DataCatcher NEXT Ver 1.18
CatchProgram = [PARA_CATCH]
File (F) Indication / editing (E) Catch start (A) Catch setting (L) Pitching box(P) Help (H)
TypeFile = [PARA_STD.TYP] CommandFile = [PARA_STD.CMD]
Channel Setting
Catch Type Setting
Channel 1
[Max catch data of each channel]
Max Length
16
[Setting of catch data measurement time]
1msec interval
(Max measurement time = 65.535 sec)
1msec interval
(Max measurement time = 6.5535 sec)
OK
キャンセル
[Start No.=00001:End No.=00009] [Data Count = 9/1000000]

24-1:<Catch Type Setting> The setting contents in this tag

[Max catch data of each channel]

<Max Length>

The number of the DATA line that is displayed to the screen is set up.

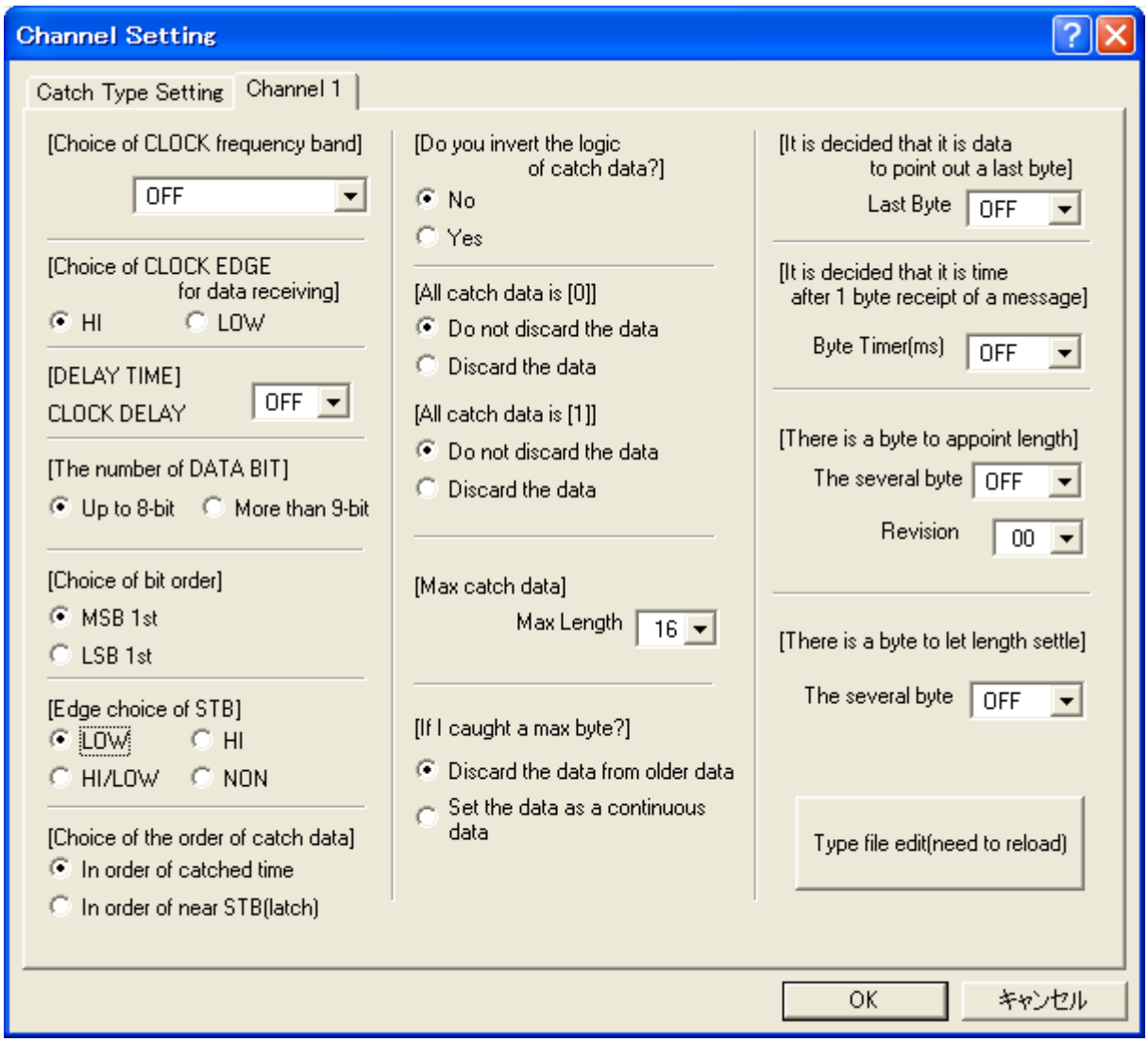
When Max Length is set up with 10 D01-D10 is displayed to the DATA line.

MAX value is 32.

[Setting of catch data measurement time]

Data catcher measures the time from the settlement of the settlement to,
present communication packet of the communication packet of before and display.
You can set up the resolution in measuring time.

24-2:<Channel1><Channel2> The setting contents in this tag



[Choice of CLOCK frequency band]

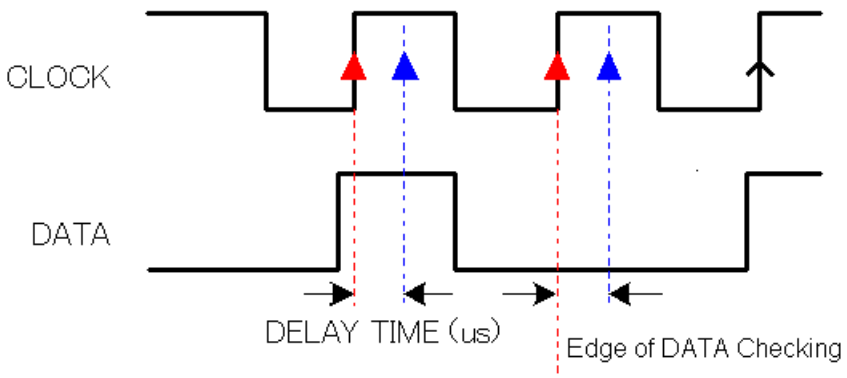
Select CLOCK frequency band of communication signal.
Enable to catch although select [OFF].
Enable to catch tolerably for blunt Hi/Low edge.
* When DC NEXT cannot catch target signal, please use this one.

[Choice EDGE of CLOCK]

Select edge of CLOCK.

[DELAY TIME]

Enable DELAY setting for the timing that CLOCK line checks DATA signal.
OFF : Checking Data signal by edge of CLOCK signal.
Enable to catch tolerably for blunt Hi/Low edge.
* When DC NEXT cannot catch target signal, please use this one.



* When DC NEXT cannot catch target signal, please use this one.

[The number of DATA BIT]

Select DATA lines Bit length.

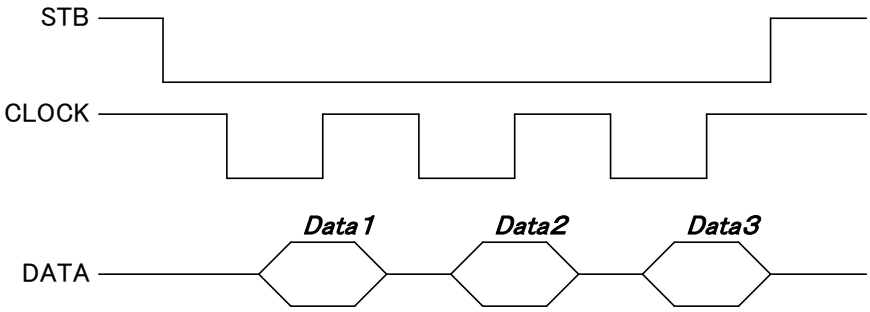
Max length is 16Bit when 9Bit over selected.

[Edge choice of STB]

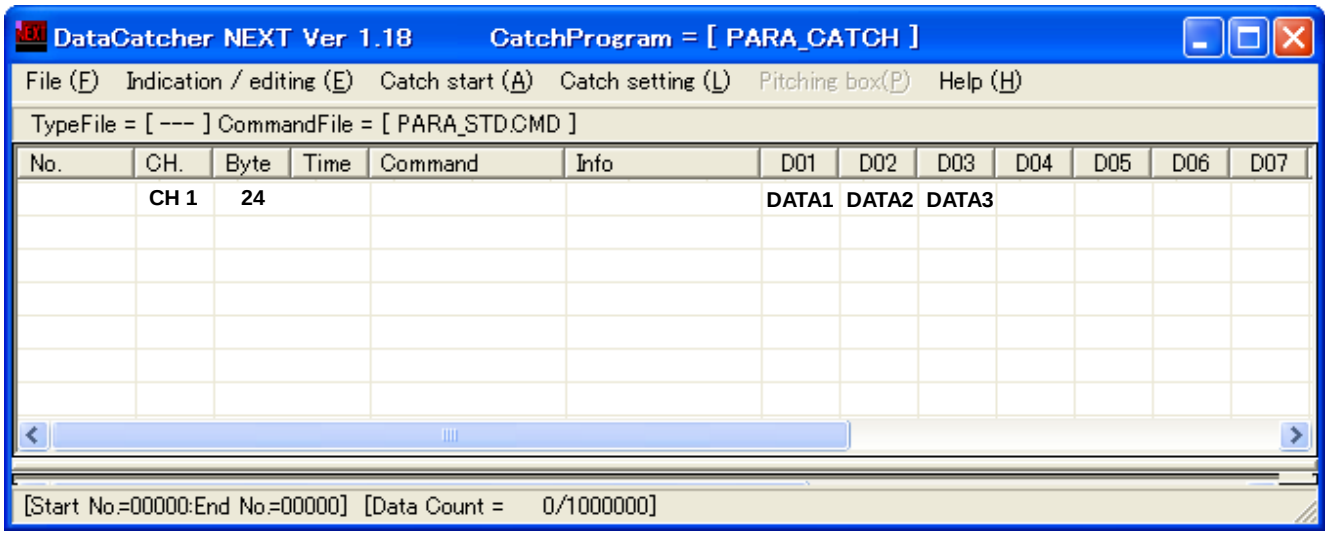
Please select EDGE of "Latch" signal.

[Choice of the order of catch data]

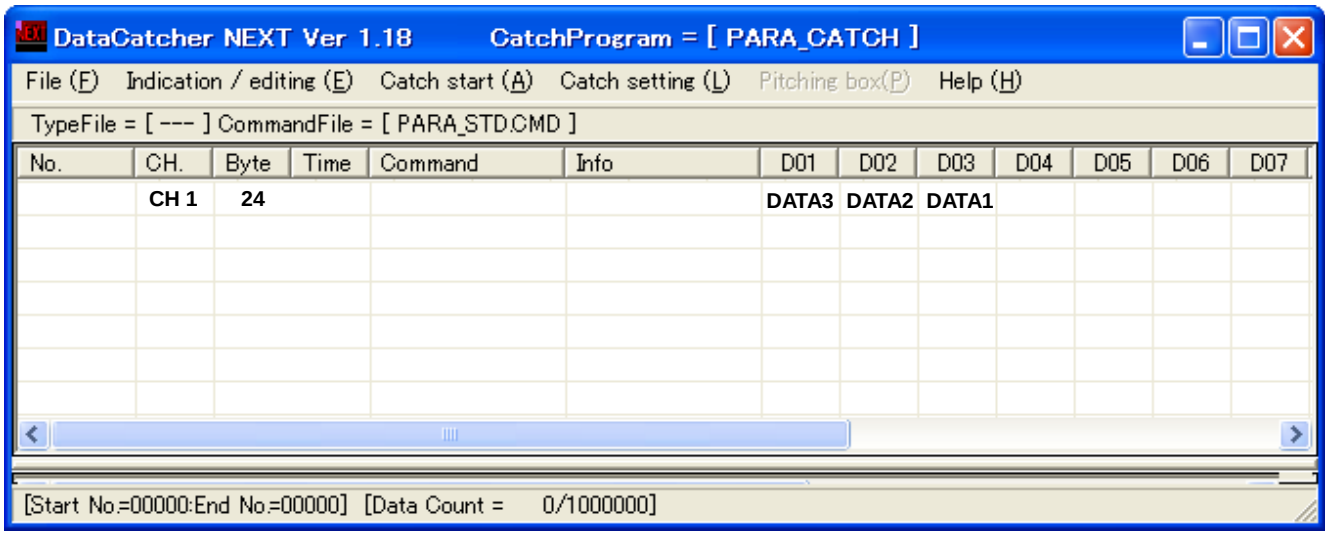
The display turn of catch data is set up.



Following window is shown after click the optional button in [In order of catched time].


DataCatcher NEXT Ver 1.18
CatchProgram = [PARA_CATCH]
File (F) Indication / editing (E) Catch start (A) Catch setting (L) Pitching box(P) Help (H)
TypeFile = [---] CommandFile = [PARA_STD.CMD]
No. CH. Byte Time Command Info D01 D02 D03 D04 D05 D06 D07
CH 1 24 DATA1 DATA2 DATA3
[Start No.=00000:End No.=00000] [Data Count = 0/1000000]

The following screen shows case that turned on [In order near STB (latch)] option button.



[Do you invert the logic of catch data?]

Select the logic inverted or not.

[All the catch data at the time of [0]]

The processing method of case that all the data of communication packet were 0 is set up.

[All the catch data at the time of [1]]

The processing method of case that all the data of communication packet were 1 is set up.

[In data decision other channel data?]

A certain channel sets up it about the processing method of the data that received it
with other channels in the time that settled communication packet,
in middle that is receiving communication data.

[Maxt catch data]

<Max Length>
The number of the DATA line that is displayed to the screen is set up.
When Max Length is set up with 10 D01-D10 is displayed to the DATA line.
MAX value is 32.
Please set up it short than " Max catch data of each channel " of page before.

[If I caught a best byte?]

You can set up it about the processing method of case
that received the data number that set up it with "Max catch data".

- On of " Discard the data from older data " the option button
  This receives it while discarding old data until communication packet settles.
- On of " Set the data as a continuous data " the option button
  This receives all the data, until communication packet is settled.
  If the byte number of communication data, becomes " MAX catch data "
  that designated the data to there is displayed.
  The data after that continuously displays it as data.

The following item sets up it about the condition that settles communication packet.

[It is decided that it is data to point out a last byte]

In the case that there is the data that shows the final byte the value of 0x00h-0xffh is set up.
Also, off is set up in the case that there is not the data that shows the final byte.

[It is decided that it is time after 1 byte receipt of a message]

Communication packet is settled in the time between BYTE.
As for the setting value, the selection is possible among 001-100 and the unit is msec.
When "off" was selected this setting becomes ineffective.

[There is a byte to appoint length]

The data that designates the length of communication packet sets up
this to be included to communication packet.

-The several byte :

In the case that the data that designates the length of communication packet is included the position of the data is set up.
This value is to 01-32. When "off" was selected this setting becomes ineffective.

-Revision :

For example the revision value is set up, in the case that the data of the position that the data of STX and ETX are included in communication packet and set up in the above does not include STX and ETX.
This value is to 01-32. In the case that there is not revision data 00 are set up.

* Available when DATA Bit length under 8BIT.

[There is a byte to let length settle]

In the case that the data that settles the length of communication packet
is included the position of the data is set up.
This value is to 01-32. When "off" was selected this setting becomes ineffective.
The length of the communication packet corresponding to this data corresponds it
like the next page by the typ file.(The example of the next page is case with regard to channel 1)
For example, and the value (the position of data) "18" are set up and please edit as follows,
to set up the length of communication packet with 16Byte. (Matrix form)

* Available when DATA Bit length under 8BIT.

- Actual file contents -

```
CH1_COMMAND_STB=00
; : 00 01 02 03 04 05 06 07 08 09 0a 0b 0c 0d 0e 0f
$00=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$10=00,00,10,00,00,00,00,00,00,00,00,00,00,00,00,00
$20=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$30=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$40=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$50=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$60=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$70=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$80=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$90=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$a0=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$b0=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$c0=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$d0=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$e0=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
$f0=00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00
```

[Editing of the type file]

The type file is opened with a/the text editor. Please use it in the case that a direct type file is edited.
The contents that changed it with channel setting window click "OK" the button once,
in the case that they were already done a change, because they are not written
in the file until they preserve the type file and choose from "File" the menu "TYPE file save"
and please do type file editing once again, after they preserved it.
By clicking this button the following information window opens.

DataCatcher NEXT Ver 1.18
TYPE FILE OPEN [C:¥Program Files¥HeartLandData¥DC NEXT¥LIB¥PARA_STD.TYP]
Open after I spare it in the case that already THE [TYPE FILE] is edited!
OK
キャンセル

24-3: Connector List

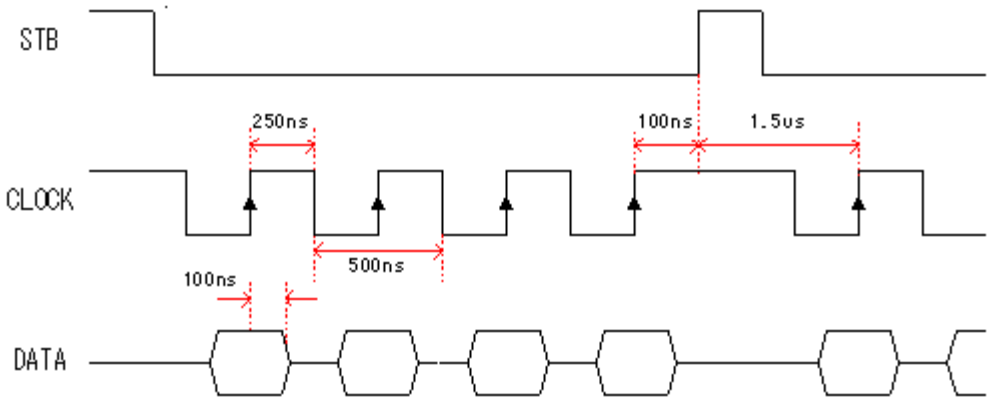
Ch No.	Pin No.	Name	Contents
1	1	CH1_CLK1	CH1 CLOCK signal input.
	2	CH1_STB	CH1 DATA signal input.
	9	D0	Parallel Data0.
	10	D1	Parallel Data1.
	11	D2	Parallel Data2.
	12	D3	Parallel Data3.
	13	D4	Parallel Data4.
	14	D5	Parallel Data5.
	15	D6	Parallel Data6.
	16	D7	Parallel Data7.
	17	D8	Parallel Data8.
	18	D9	Parallel Data9.
	19	D10	Parallel Data10.
	20	D11	Parallel Data11.
	21	D12	Parallel Data12.
	22	D13	Parallel Data13.
	23	D14	Parallel Data14.
	24	D15	Parallel Data15.
	47	EVENT	Event signal output by setting of Event filter.
	48	TRIG	External trigger input.

CAUTION:

- Connect target GND with DC NEXT board GND.
  Please ground even so the catch data is unsteady.
- Power DC NEXT before connecting probe with communication line. If not, it cause of trouble.

24-4: Restrictions

Max receivable CLOCK frequency.	2MHz
Data Hold Time.	Over 100nsec
The time to be able to receive the next CLOCK after 1byte received.	Over 1.5us



* CLOCK edge is delayed internally when [Choice of CLOCK frequency band] and 【DELAY TIME】 are used at the same time.
Since the data catch timing depends on the setting value, unsuitable setting may delay the timing, and then the catch data is not shown correctly.

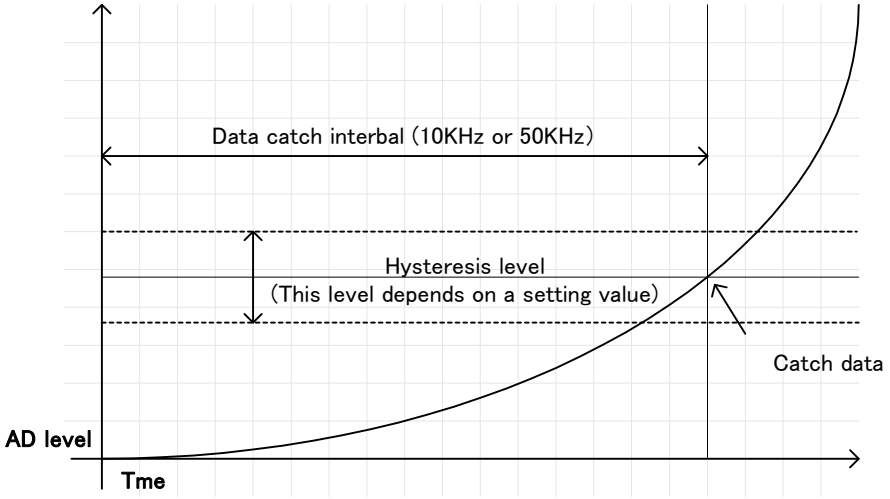
- Following feature is available when DATA Bit length under 8BIT.
  - Fixed packet data by ordering Byte length.
  - Fixed packet by ordering Byte length.

25. [DATA_LOGGER]Catch Program

25-1:Catch of digital signal

- Enable to judge the analog signal HI or LOW continuously by using CMOS level as threshold.
- Enable to select catch interbal 10KHz/50KHz.
- Enable to use 8 channels.
- CMOS level is VIH(VB*0.7V)/VIL(VB*0.3V).
  * VB = VB SW on DC NEXT board voltage.

25-2:Catch of analog signal

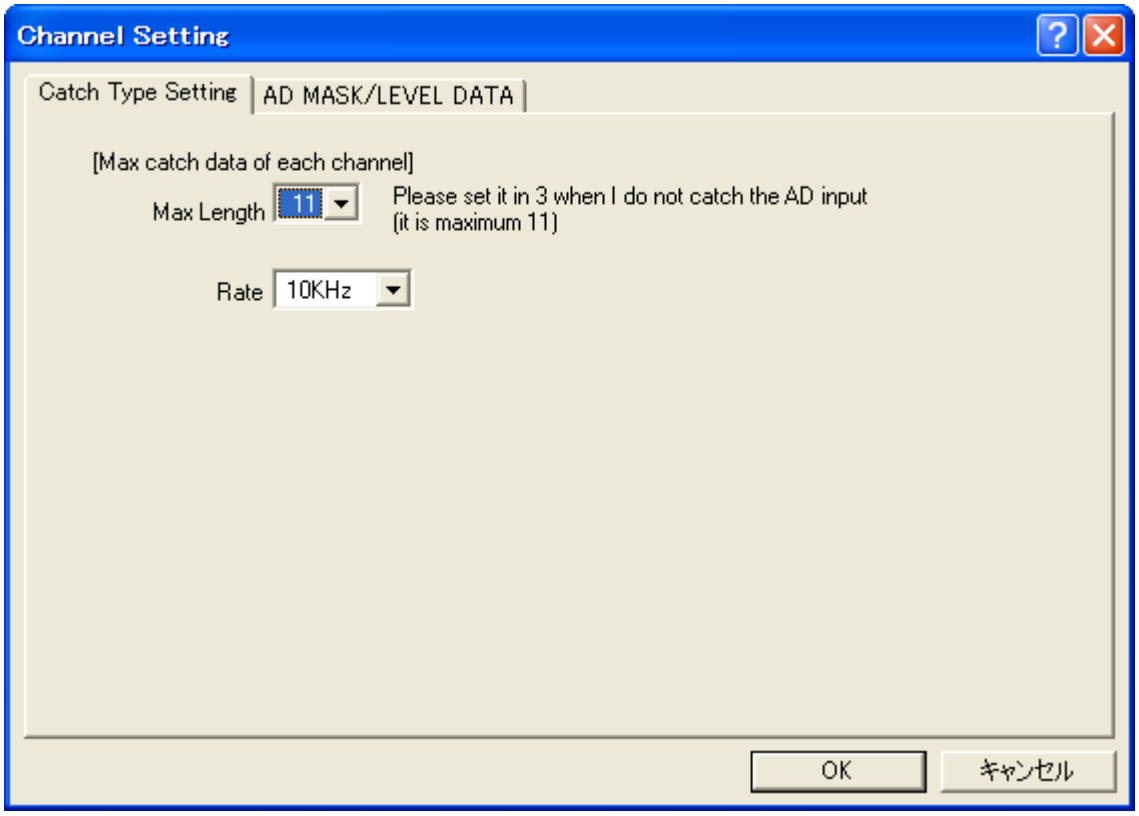


- Enable to catch AD level with 8bit resolution.
- Enable to select catch interbal 10KHz/50KHz.
  The change signal level is shown on the monitor when the change is detected.
- Enable to adjust amount of change by setting of hysteresis.
- Enable to use 8 channels.

26. About the setting of Data loger

26-1:<Catch Type Setting> the setting contents in the tag

By clicking [Catch setting (L)]-[Catch type setting (P)] the < Channel Setting > dialog box can open.
Please do the setting with regard to the Data loger.
Please set up it in accordance with the following explanation.



[Max catch data]

<Max Length>

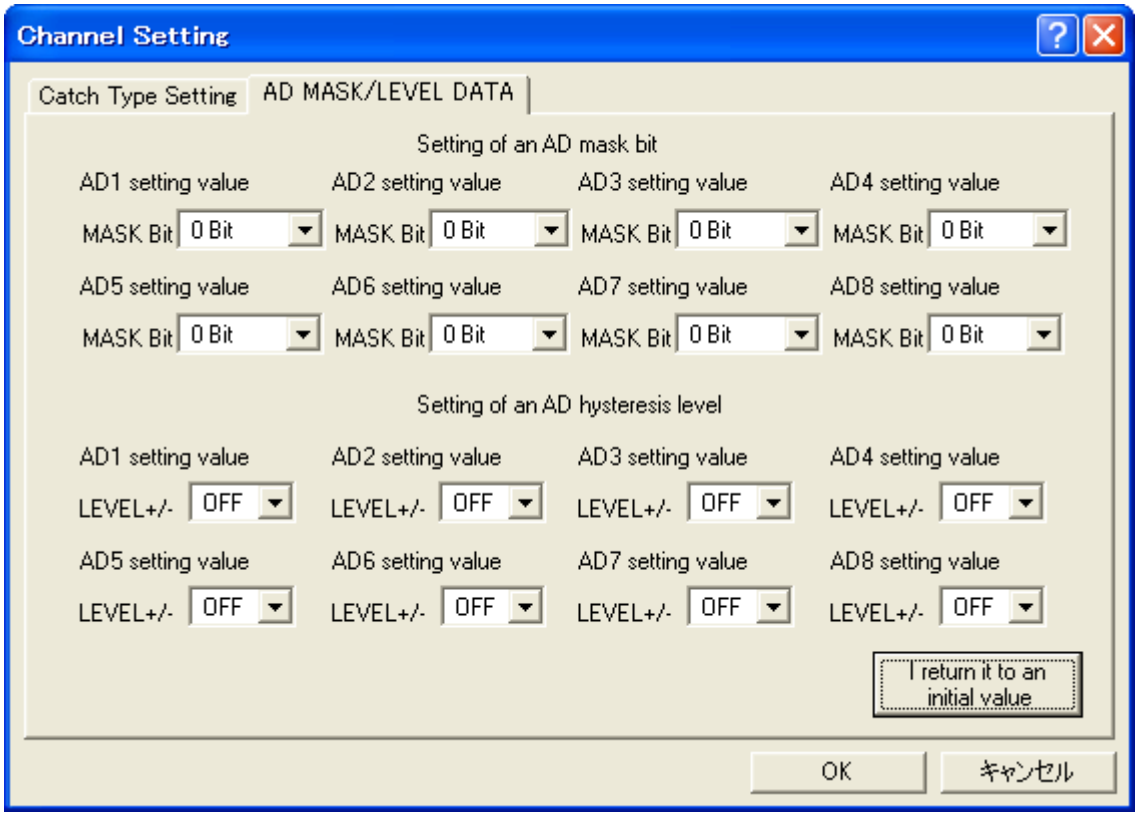
The number of the DATA line that is displayed to the screen is set up.
When Max Length is set up with 10 D01-D10 is displayed to the DATA line.
MAX value is 11.

[Rete]

Select Sampling Rate. 10KHz or 50KHz selectable.

26-2: <AD MASK/LEVEL DATA> the setting contents in the tag

The method of the catch of AD is able to be set up.



- Setting of an AD mask bit
  The bit number that masks to AD data is set up.
- Setting of an AD hysteresis
  Hysteresis of AD catch is set up.

26-3: Connector List

Ch No	Pin No	Name	Contents
1	1	CMOS1(D01 1bit)	Digital signal input－1
	2	CMOS2(D01 3bit)	Digital signal input－2
	3	CMOS3(D01 4bit)	Digital signal input－3
	4	CMOS4(D02 1bit)	Digital signal input－4
	5	CMOS5(D02 3bit)	Digital signal input－5
	6	CMOS6(D02 4bit)	Digital signal input－6
	7	CMOS7(D03 1bit)	Digital signal input－7
	8	CMOS8(D03 3bit)	Digital signal input－8
2	37	ADC1(D04)	Analog input－AD1
	38	ADC2(D05)	Analog input－AD2
	39	ADC3(D06)	Analog input－AD3
	40	ADC4(D07)	Analog input－AD4
	41	ADC5(D08)	Analog input－AD5
	42	ADC6(D09)	Analog input－AD6
	43	ADC7(D010)	Analog input－AD7
	44	ADC8(D011)	Analog input－AD8

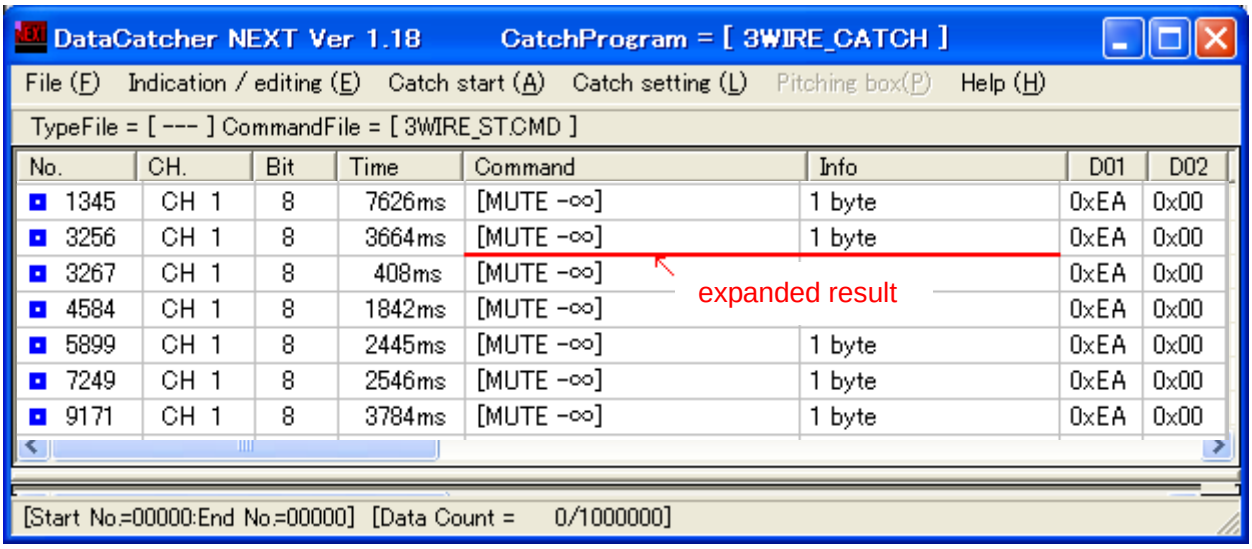
Attention:

- **Please connect GND of the GND terminal and target.**
  Please take the ground in the case that catch data is unstable even
  if the GND terminal is connected.
- **CLK1 and CLK2 of each channel please do not short-circuit.**
- **Please connect probe after the power supply of DC2000 is input without fail.**

27. How to make Command Analyzing Definition File

Command Analyzing Definition File is the file that is defined in how to expand the catch data (Display Image-1 D01~D10 bellow) and how to display them in the position shown "expanded result" in Display Image-1. File extensions of this file should be ".cmd" though this file can be saved in any directories. When installing, files such as "3Wire_st.cmd" etc are made in "HeartLandData¥DC_NEXT¥lib", please refer to these files.

[Display Image-1]


DataCatcher NEXT Ver 1.18
CatchProgram = [3WIRE_CATCH]
File (F) Indication / editing (E) Catch start (A) Catch setting (L) Pitching box(P) Help (H)
TypeFile = [---] CommandFile = [3WIRE_ST.CMD]
No. CH. Bit Time Command Info D01 D02
1345 CH 1 8 7626ms [MUTE -∞] 1 byte 0xEA 0x00
3256 CH 1 8 3664ms [MUTE -∞] 1 byte 0xEA 0x00
3267 CH 1 8 408ms [MUTE -∞] 0xEA 0x00
4584 CH 1 8 1842ms [MUTE -∞] 0xEA 0x00
5899 CH 1 8 2445ms [MUTE -∞] 1 byte 0xEA 0x00
7249 CH 1 8 2546ms [MUTE -∞] 1 byte 0xEA 0x00
9171 CH 1 8 3784ms [MUTE -∞] 1 byte 0xEA 0x00
expanded result
[Start No.=00000:End No.=00000] [Data Count = 0/1000000]

27-1: Feature(Useful to do this)

- Possible to expand and display the catch data(D01-) in the form easy to understand in "Command" column and "Info" column.
- Only describing the expression (left is the catch data and right is the form to display) in Command Analyzing Definition File with a text editor
- Possible to display multiply the form, Dec, Hex, ASCII, Bits, Strings
- The form is similar to printf() function in the C and easy to learn
  -Easy to confirm the modified item immediately loading the file in the Catch Window

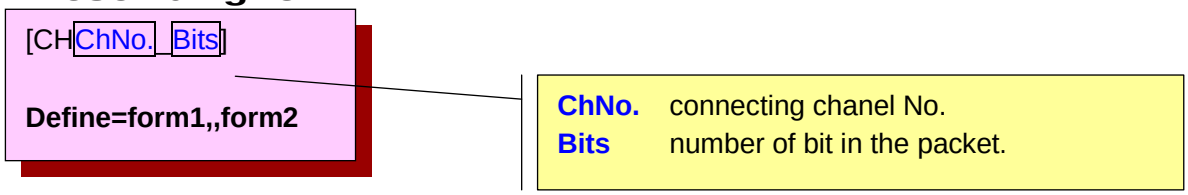
27-2: Restriction/Limitation

- Cannot use ","(comma) in strings
- Please describe "%%" when using "%" in strings
- The number of character in one line is up to 256
- Lines which begin with ";"(semi-colon) are comment line

27-3: Section

[1] 3WIRE_CATCH

- Describing form -



- Comments -

When describing [CH1_008], this means the definition to the packet made of 8 bits in chanel-1.
This system limits the number of data possible to display in one line to 32 bytes.
For example, the packet made of 36 bytes is displayed in two lines. Each data 33~36th are displayed as D01~D04 in the
line with "CHCONTX"(X is CHNo.) in "CH" column. In this case, the form in this line is [CHCONTChNo._Bits], and the description is [CHCONT1_032].

When describing [CH1_000], the number of bit in the packet is ignored and all catch packets in chanel-1 will be expanded and displayed.
The form is divided by ",,"(comma, comma), so that form1 can be displayed as "[MUTE] -00" in Command column (refer to "expanded result" Image-1), and form2, "1 byte" in Info column.
Define form and Display form is mentioned later.

- Notes -

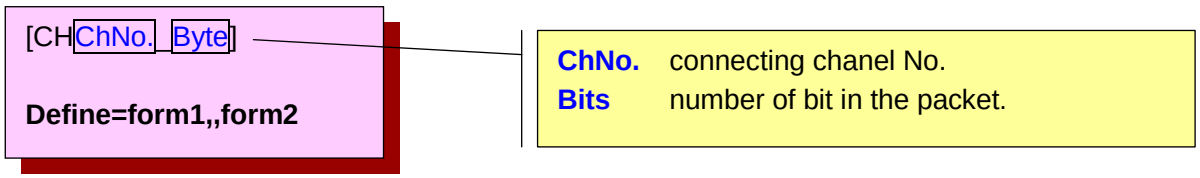
Please set the number of Bit in 3-digit number.

Example	Description
When a packet in chanel-1 is 8 bit data.	[CH1_008]
When a packet in chanel-1 is 16 bit data.	[CH1_016]
When a packet in chanel-1 is 128 bit data.	[CH1_128]

Alphabets can be described in both capital letter and small letter but cannot be mixed.

[2] I2CBUS_100K/400K

- Describing form -



- Comments -

When describing **[CH1_008]**, this means the definition to the packet made of 8 bits in chanel-1.
This system limits the number of data possible to display in one line to 32 bytes.
For example, the packet made of 36 bytes is displayed in two lines.
Each data 33~36th are displayed as D01~D04 in the line with "**CHCONTX**"(**X** is CHNo.)
in "CH" column. In this case, the form in this line is **[CHCONTChNo._Bytes]**,
and the description is **[CHCONT1_004]**.
When describing **[CH1_000]**, the number of byte in the packet is ignored
and all catch packets in chanel-1 will be expanded and displayed.
The form is divided by "**,,**"(comma, comma), so that form1 can be displayed
as "**[MUTE] -00**" in Command column (refer to "expanded result" Image-1),
and form2, "**1 byte**" in Info column.

Define form and **Display form** is mentioned later.

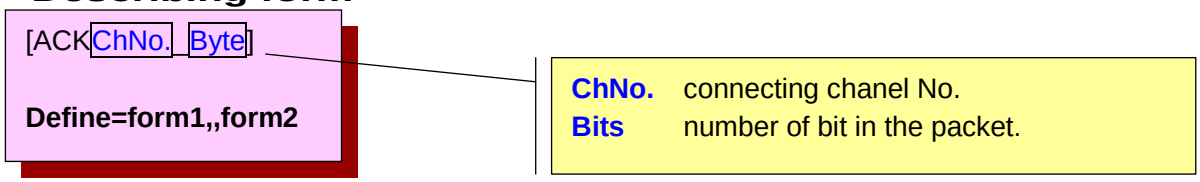
- Notes -

Please set the number of Bit in 3-digit number.

Example	Description
When a packet in chanel-1 is 8 byte data.	[CH1_008]
When a packet in chanel-1 is 16 byte data.	[CH1_016]

Alphabets can be described in both capital letter and small letter but cannot be mixed.

- Describing form -

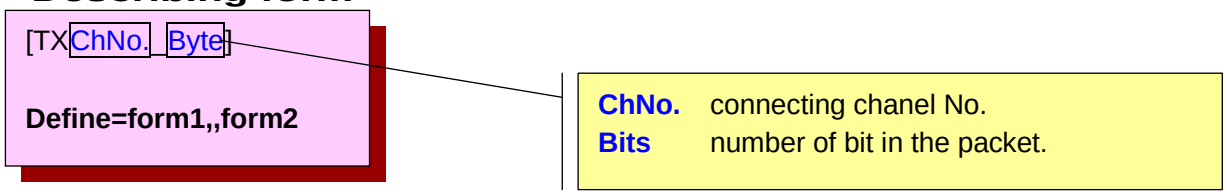


- Comments -

In I2C Standard, 2 lines are 1 set, in first line, displayed communication data,
in second line, ACK/NACK to the communication data.
When describing **[ACK1_002]**, this means the definition to ACK/NACK
in the packet made of 2 bytes in chanel-1.

[3] UART

- Describing form -



- Comments -

When describing **[TX1_008]**, this means the definition to the packet made of 8 bytes in chanel-1.
This system limits the number of data possible to display in one line to 32 bytes.
For example, the packet made of 36 bytes is displayed in two lines.
Each data 33~36th are displayed as D01~D04 in the line with "**CHCONTX**"(**X** is CHNo.)
in "CH" column. In this case, the form in this line is **[TXCONTChNo._Bytes]**,
and the description is **[TXCONT1_004]**.
When describing **[TX1_000]**, the number of byte in the packet is ignored
and all catch packets in chanel-1 will be expanded and displayed.
The form is divided by "**,,**"(comma, comma), so that form1 can be displayed
as "**[MUTE] -∞**" in Command column (refer to "expanded result" Image-1),
and form2, "**1 byte**" in Info column.

Define form and **Display form** is mentioned later.

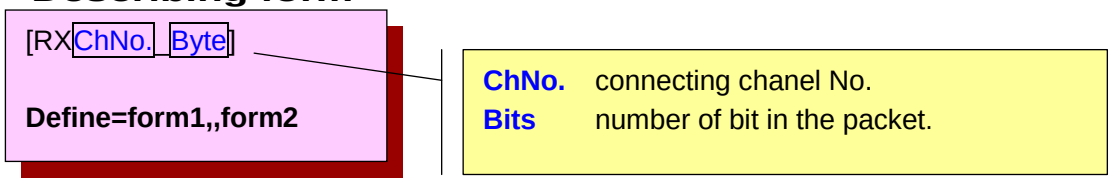
- Notes -

Please set the number of Byte in 3-digit.

Example	Description
When a packet of TXD in chanel-1 is 8 byte data.	[TX1_008]
When a packet of TXD in chanel-1 is 8 byte data.	[TX1_016]

Alphabets can be described in both capital letter and small letter but cannot be mixed.

- Describing form -



- Comments -

When describing **[RX1_008]**, this means the definition to the packet made of 8 bytes in chanel-1.
This system limits the number of data possible to display in one line to 32 bytes.
For example, the packet made of 36 bytes is displayed in two lines.
Each data 33~36th are displayed as D01~D04 in the line with "**RXCONTX**"(**X** is CHNo.)
in "CH" column. In this case, the form in this line is **[RXCONTChNo._Bytes]**,
and the description is **[RXCONT1_004]**.
When describing **[RX1_000]**, the number of byte in the packet is ignored
and all catch packets in chanel-1 will be expanded and displayed.

27-4: Definition

There are 2 kinds of HEX and BIT forms in the Definition.

[1] Defenition of HEX form.

- Description form -

$HEX numberh or $HEX numberH

HEX number Hexadecimal number 0~f

- Comments -

Please do not use a character except the number and en a(A), b(B), c(C), d(D), e(E), f(F), x(X).

The following **HEX number** is considered as a fixed number.
0,1,2,3,4,5,6,7,8,9, a(A),b(B),c(C),d(D),e(E),f(F)
When **HEX number** is **x** or **X**, the data of its part is ignored.

- Examples -

$10h=
$0xh=
$xxh=
$12h34h=
$12hxxhxxhxxh=

[2] Defenition of Bit form.

- Description form -

$BIN numberb or $BIN numberB

BIN number Binary number 0 or 1

- Comments -

Please do not use a character except 0,1,x(X).
When **BIN number** is 0 or 1, it is considered as a fixed number.
When **HEX number** is **x** or **X**, the data of its part is ignored.

- Examples -

$10000000b=
$0000xxxxb=
$xxxxxxxxb=
$00010010B00110100B=
$00010010bXXXXXXXXbXXXXXXXXbXXXXXXXXb=

[3] Defenition mixed HEX form and bit form.

In the 1BYTE unit, the mixture of the HEX form and BIT form are possible.

- Description form -

$BIN numberbHEX numberh
$HEX numberhBIN numberb

HEX number Hexadecimal number 0~f
BIN number Binary number 0 or 1

- Examples -

$10000000b20h=
$0000xxxxbXXh=
$xxhxxxxxxxxb=
$00010010B00110100B=
$xxh00010010b00110100Bxxh=

The line which begins with "$=", all data are correspond to this.
The data is expanded and displayed when it corresponds to the definition comparing with the definition in order. Therefor, the definition with "$=" in the head is correspond to all data, please be careful.

27-5: Form

The usual string is displayed as it is in the "Command" column or "Info" column.
The definition whose form is designated as follow is displayed in accordance with the form contents.

- Description form -

%(widthtype,Argument)

Width	narrowest width of display field
Type	display form type
Argument	data to be expanded

- Comments -

[1] width

width to be set as the narrowest width display field

n	At least the n character is displayed. The blank is filled in left if the actual display width is smaller than n character.
0n	At least the n character is displayed. 0 is filled in left if the actual display width is smaller than n character.

[2] type

type to be set as how to display in display field

d	Integer displayed in signed decimal number
u	Integer displayed in unsigned decimal number
b	Integer displayed in binary number
x	Integer displayed in hexadecimal number (use small letter)
X	Integer displayed in hexadecimal number (use capital letter)
C	character displayed in ASCII character
S??	Strings set the kind of string pattern table

[3] Argument

***Argument* shows the DATA No. in 'DATA' column in accordance with the instruction of width and type.**

d*mm*-d*nn*

This shows DATA*mm*~DATA*nn*. '*mm*' and '*nn*' are the number of **01~32.**

d*nn* is lower byte. When **-d*nn*** is omitted, 1 byte data designated by **d*mm*** is shown.

d*mm*b*n*-d*oo*b*p*

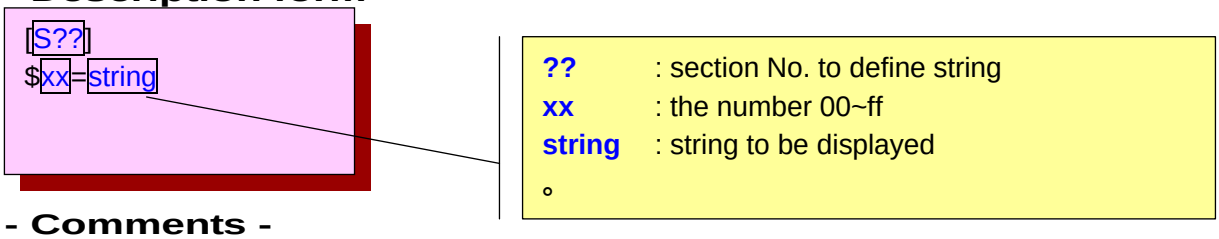
This shows DATA*mm*.BIT*n*~DATA*oo*.BIT*p*. '*mm*' and '*oo*' are the number of **01-32**.

'*n*' and '*p*' are the number of 1~8.

d*oo*b*p* is lower. When **–d*oo*b*p*** is omitted, 1 bit data designated by **d*mm*b*n*** is shown.

27-6: String Pattern Definition

- Description form -



- Comments -

In **S??**, the section which defines **S01~S99(total 99 kinds)** string pattern can be designated.
In **$xx**, 256 table data($00~$ff) can be designated.
The number of character of string is to 63.

- Examples -

[S01]
$00=strings A : display 'STRING-A' when argument is 00hex
$3F=strings B : display 'STRING-B' when argument is 3Fhex

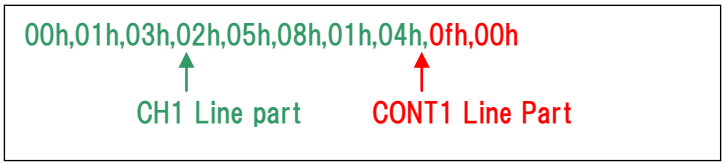
27-7: Special Definition

Possible to define display form regarding 2 lines
This is useful in the case the number of byte in the packet is over 32.

- Examples -

```
[CHCONT1_000]
$-1txxh01h=ZERO=%(4b,d01b4-d01b1)
```

- Content Of Packet -



- Displaying Image -

No.	command	CH.	Byte	D01	D02	D03	D04	D05	D06	D07	D08
1		CH1	8	0x00	0x01	0x03	0x02	0x05	0x08	0x01	0x04
2	ZERO=1111	CONT1	2	0x0f	0x00	0x00	0x00	0x00	0x00	0x00	0x00

- Comments -

There should be the definition to each No.1 and No.2 line in above display contents, because the definition of command analysis is to define in each display line in this system.

In the setting menu of the communication type,
the communication packet can be displayed in 2 lines
(referring to the manual of each catch program).
(When the number of byte in communication packet is over 32,
after 33rd byte is automatically displayed next line.)
In that case, this definition is useful.
The above example shows the definition to No.2 line,
but the reference of the previous line is possible by using **$-1t**.
In this case, using $-1t, D02 in No.1 line is the object to define.
Also, using **$+xt** is possible, and the data before x lines is the object to define.
x is possible to describe in **1~9** range.

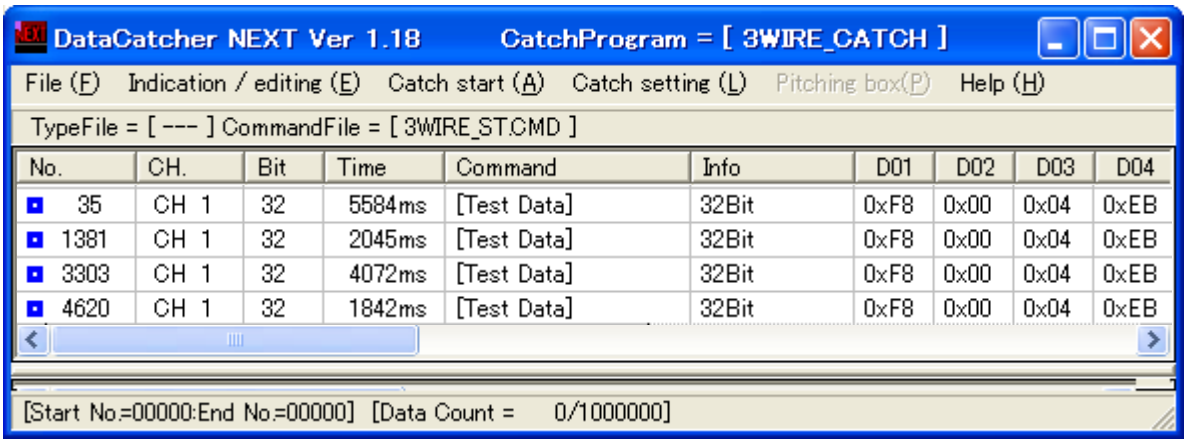
27-8: Description Example and Display Image

[1]This is the description example and display result about the case: displaying "[Test Data]" in "Command" column and "32bit" in "Info" column when D01 in No.2 is 0xF8.

- Examples -

[CH1_032]
$F8hxxhxxhxxh=[Test Data],,32Bit

- Display Image -


DataCatcher NEXT Ver 1.18
CatchProgram = [3WIRE_CATCH]
File (F) Indication / editing (E) Catch start (A) Catch setting (L) Pitching box(P) Help (H)
TypeFile = [---] CommandFile = [3WIRE_ST.CMD]
No. CH. Bit Time Command Info D01 D02 D03 D04
35 CH 1 32 5584ms [Test Data] 32Bit 0xF8 0x00 0x04 0xEB
1381 CH 1 32 2045ms [Test Data] 32Bit 0xF8 0x00 0x04 0xEB
3303 CH 1 32 4072ms [Test Data] 32Bit 0xF8 0x00 0x04 0xEB
4620 CH 1 32 1842ms [Test Data] 32Bit 0xF8 0x00 0x04 0xEB
[Start No.=00000:End No.=00000] [Data Count = 0/1000000]

* The image is for DC2000 since this function is same as DC2000.

[2]This is the description example in the case of defining above D01 in binary form.
In this case display result will be same with above display image.

- Examples -

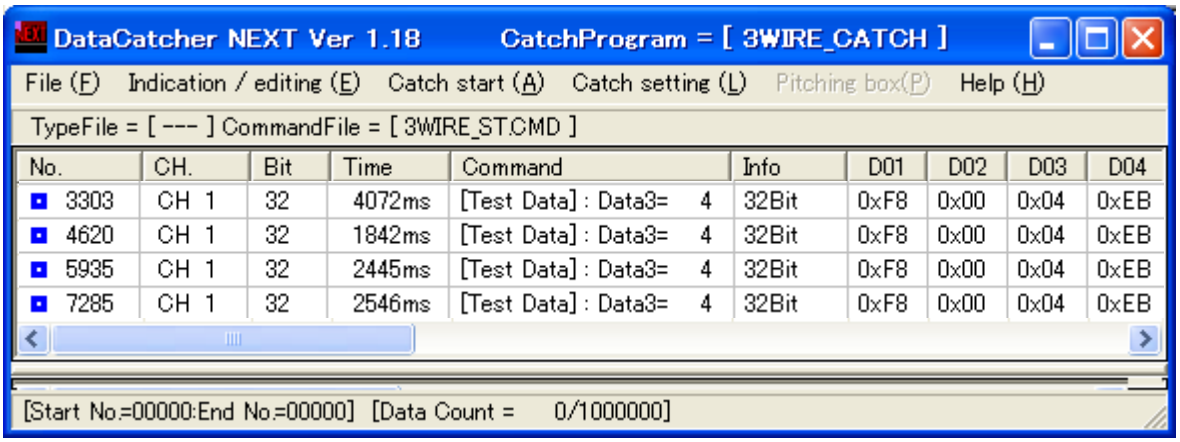
[CH1_032]
$11111000bxxhxxhxxh=[Test Data],,32Bit

[3]This is the description example and display result about the case: displaying decimal number in 5-digit (filled in blank left if the display digit is smaller than 5) after "[Test Data] : Data4=" in "Command" column when D03 in No.2 is 0xF8.

- Examples -

[CH1_032]
$F8hxxhxxhxxh=[Test Data] : Data3=%(5d,d04),,32Bit

- Display Image -


DataCatcher NEXT Ver 1.18
CatchProgram = [3WIRE_CATCH]
File (F) Indication / editing (E) Catch start (A) Catch setting (L) Pitching box(P) Help (H)
TypeFile = [---] CommandFile = [3WIRE_ST.CMD]
No. CH. Bit Time Command Info D01 D02 D03 D04
3303 CH 1 32 4072ms [Test Data] : Data3= 4 32Bit 0xF8 0x00 0x04 0xEB
4620 CH 1 32 1842ms [Test Data] : Data3= 4 32Bit 0xF8 0x00 0x04 0xEB
5935 CH 1 32 2445ms [Test Data] : Data3= 4 32Bit 0xF8 0x00 0x04 0xEB
7285 CH 1 32 2546ms [Test Data] : Data3= 4 32Bit 0xF8 0x00 0x04 0xEB
[Start No.=00000:End No.=00000] [Data Count = 0/1000000]

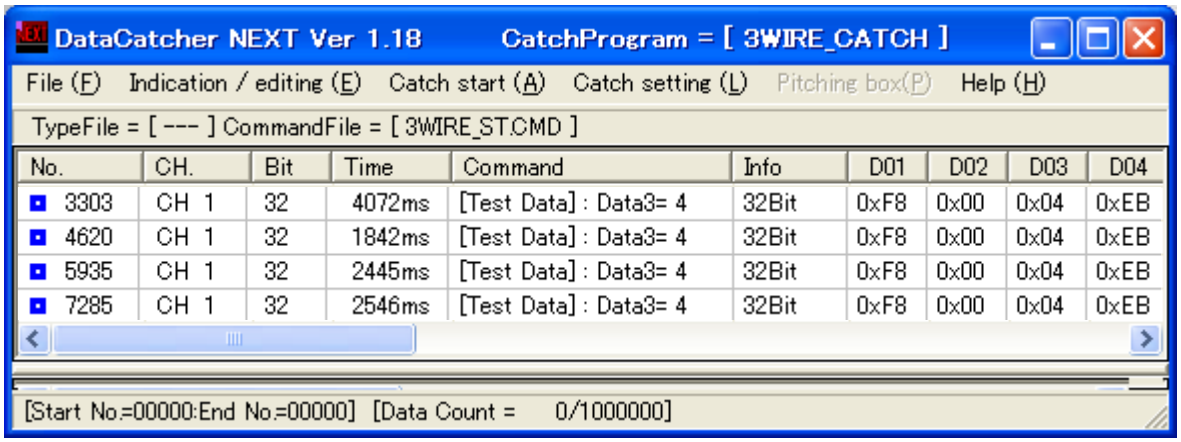
[4]This is the description example in the case of changing above definition to display in 2-digit.

- Examples -

[CH1_032]

$F8hxxhxxhxxh=[Test Data] : Data3=%(2d,d03),,32Bit

- Display Image -


DataCatcher NEXT Ver 1.18
CatchProgram = [3WIRE_CATCH]
File (F) Indication / editing (E) Catch start (A) Catch setting (L) Pitching box(P) Help (H)
TypeFile = [---] CommandFile = [3WIRE_ST.CMD]
No. CH. Bit Time Command Info D01 D02 D03 D04
3303 CH 1 32 4072ms [Test Data] : Data3= 4 32Bit 0xF8 0x00 0x04 0xEB
4620 CH 1 32 1842ms [Test Data] : Data3= 4 32Bit 0xF8 0x00 0x04 0xEB
5935 CH 1 32 2445ms [Test Data] : Data3= 4 32Bit 0xF8 0x00 0x04 0xEB
7285 CH 1 32 2546ms [Test Data] : Data3= 4 32Bit 0xF8 0x00 0x04 0xEB
[Start No.=00000:End No.=00000] [Data Count = 0/1000000]

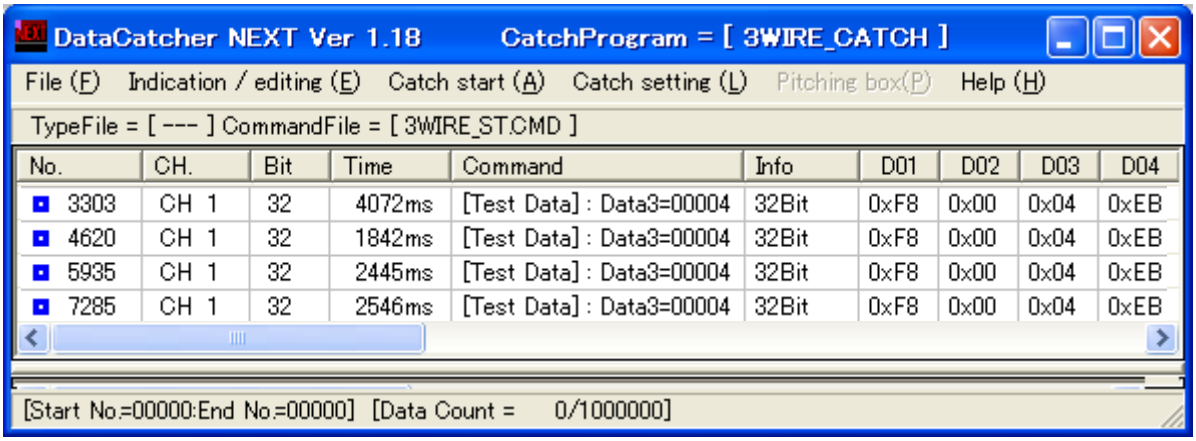
[5]This is the example in the same condition with[3]in the case filled in 0 left if the display digit is smaller than the digit set by user

- Examples -

[CH1_032]

$F8hxxhxxhxxh=[Test Data] : Data3=%(5d,d03),,32Bit

- Display Image -


DataCatcher NEXT Ver 1.18
CatchProgram = [3WIRE_CATCH]
File (F) Indication / editing (E) Catch start (A) Catch setting (L) Pitching box(P) Help (H)
TypeFile = [---] CommandFile = [3WIRE_ST.CMD]
No. CH. Bit Time Command Info D01 D02 D03 D04
3303 CH 1 32 4072ms [Test Data] : Data3=00004 32Bit 0xF8 0x00 0x04 0xEB
4620 CH 1 32 1842ms [Test Data] : Data3=00004 32Bit 0xF8 0x00 0x04 0xEB
5935 CH 1 32 2445ms [Test Data] : Data3=00004 32Bit 0xF8 0x00 0x04 0xEB
7285 CH 1 32 2546ms [Test Data] : Data3=00004 32Bit 0xF8 0x00 0x04 0xEB
[Start No.=00000:End No.=00000] [Data Count = 0/1000000]

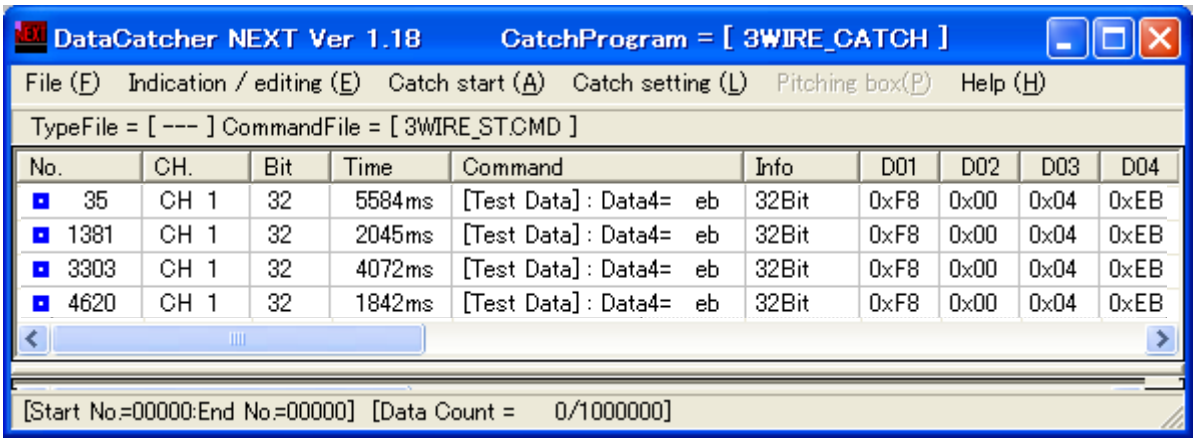
[6]This is the description example and display result about the case: displaying D04 in No.2 as a hexadecimal number after "[Test Data] : Data4=" in "Command" column.

- Examples -

[CH1_032]

$F8hxxhxxhxxh=[Test Data] : Data4=%(5x,d04),,32Bit

- Display Image -


DataCatcher NEXT Ver 1.18 CatchProgram = [3WIRE_CATCH]
File (F) Indication / editing (E) Catch start (A) Catch setting (L) Pitching box(P) Help (H)
TypeFile = [---] CommandFile = [3WIRE_ST.CMD]
No. CH. Bit Time Command Info D01 D02 D03 D04
35 CH 1 32 5584ms [Test Data] : Data4= eb 32Bit 0xF8 0x00 0x04 0xEB
1381 CH 1 32 2045ms [Test Data] : Data4= eb 32Bit 0xF8 0x00 0x04 0xEB
3303 CH 1 32 4072ms [Test Data] : Data4= eb 32Bit 0xF8 0x00 0x04 0xEB
4620 CH 1 32 1842ms [Test Data] : Data4= eb 32Bit 0xF8 0x00 0x04 0xEB
[Start No.=00000:End No.=00000] [Data Count = 0/1000000]

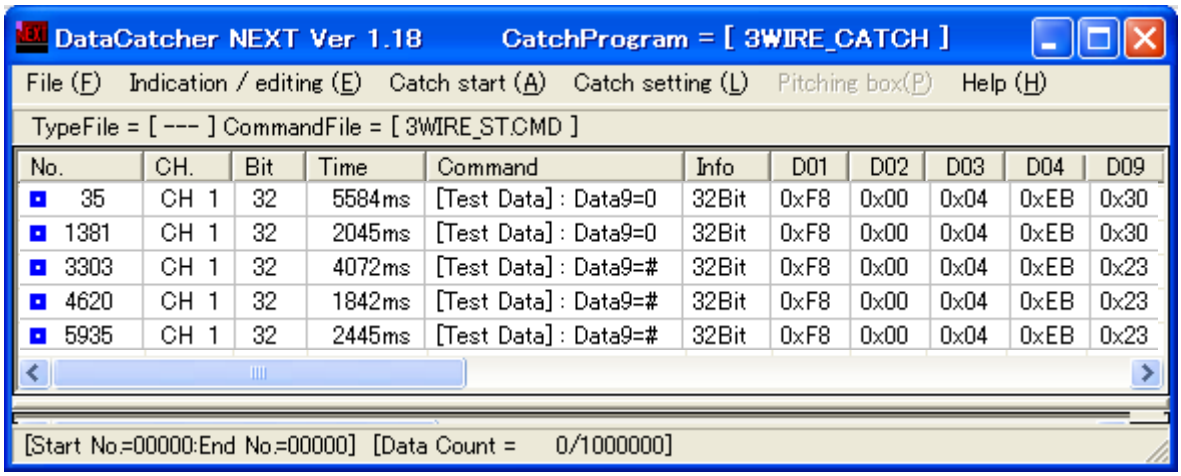
[7]This is the description example and display result about the case: displaying D09 in No.2 as an ASCII character after "[Test Data] : Data4=" in "Command" column.

- Examples -

[CH1_032]

$F8hxxhxxhxxh=[Test Data] : Data9=%(c,d09),,32Bit

- Display Image -


DataCatcher NEXT Ver 1.18 CatchProgram = [3WIRE_CATCH]
File (F) Indication / editing (E) Catch start (A) Catch setting (L) Pitching box(P) Help (H)
TypeFile = [---] CommandFile = [3WIRE_ST.CMD]
No. CH. Bit Time Command Info D01 D02 D03 D04 D09
35 CH 1 32 5584ms [Test Data] : Data9=0 32Bit 0xF8 0x00 0x04 0xEB 0x30
1381 CH 1 32 2045ms [Test Data] : Data9=0 32Bit 0xF8 0x00 0x04 0xEB 0x30
3303 CH 1 32 4072ms [Test Data] : Data9=# 32Bit 0xF8 0x00 0x04 0xEB 0x23
4620 CH 1 32 1842ms [Test Data] : Data9=# 32Bit 0xF8 0x00 0x04 0xEB 0x23
5935 CH 1 32 2445ms [Test Data] : Data9=# 32Bit 0xF8 0x00 0x04 0xEB 0x23
[Start No.=00000:End No.=00000] [Data Count = 0/1000000]

[8]This is the description example and display result about the case: displaying "MUTE" after "[Test Data] : Data4=" in "Command" column when D01 in No.2 is 0xF8.

- Examples -

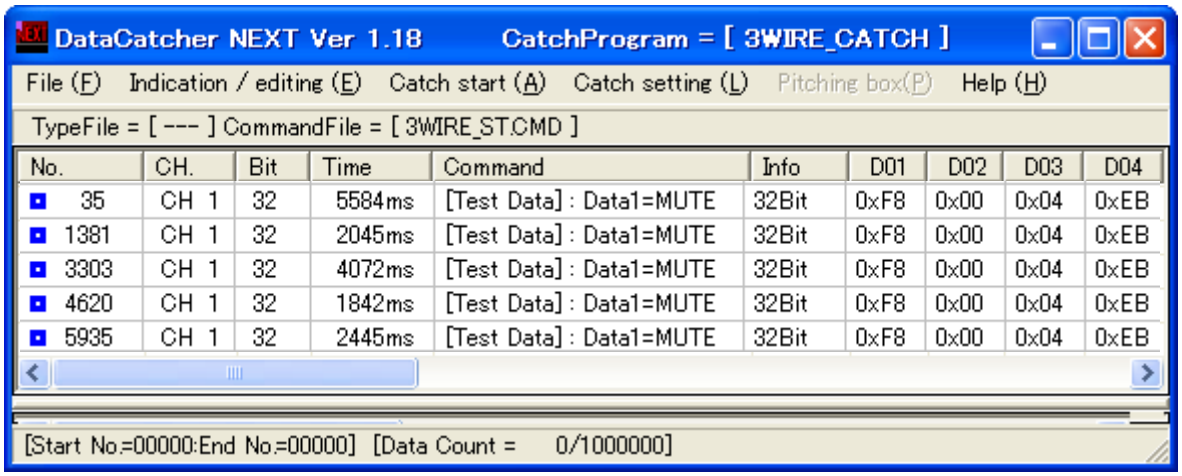
[CH1_032]

$F8hxxhxxhxxh=[Test Data] : Data1=%(S01,d01),,32Bit

[S01]

$F8=MUTE

- Display Image -

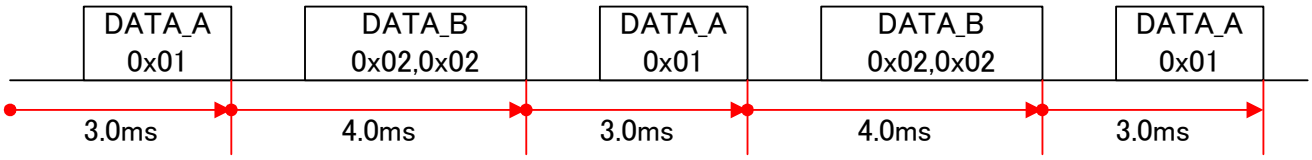

DataCatcher NEXT Ver 1.18
CatchProgram = [3WIRE_CATCH]
File (F) Indication / editing (E) Catch start (A) Catch setting (L) Pitching box(P) Help (H)
TypeFile = [---] CommandFile = [3WIRE_ST.CMD]
No. CH. Bit Time Command Info D01 D02 D03 D04
35 CH 1 32 5584ms [Test Data] : Data1=MUTE 32Bit 0xF8 0x00 0x04 0xEB
1381 CH 1 32 2045ms [Test Data] : Data1=MUTE 32Bit 0xF8 0x00 0x04 0xEB
3303 CH 1 32 4072ms [Test Data] : Data1=MUTE 32Bit 0xF8 0x00 0x04 0xEB
4620 CH 1 32 1842ms [Test Data] : Data1=MUTE 32Bit 0xF8 0x00 0x04 0xEB
5935 CH 1 32 2445ms [Test Data] : Data1=MUTE 32Bit 0xF8 0x00 0x04 0xEB
[Start No.=00000:End No.=00000] [Data Count = 0/1000000]

28. Additional function / Trouble correction

28-1:OS

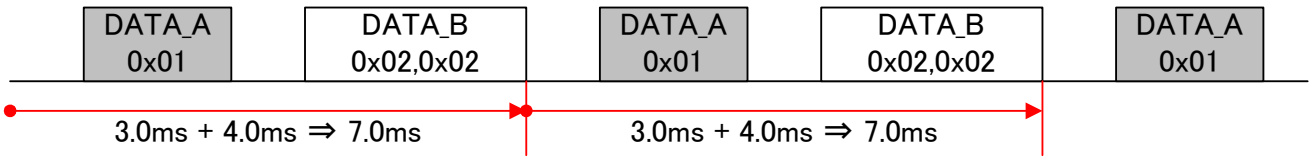
OS :WindowsXP, Windows Vista, Windows 7

28-2: Log window, The improvement of the measuring time indication after a setup of a filter



No.	CH.	Byte	Time	Command	Info	D01	D02	D03
1	CH 1	1	3.0ms			0x01	---	---
2	CH 1	2	4.0ms			0x02	0x02	---
3	CH 1	1	3.0ms			0x01	---	---
4	CH 1	2	4.0ms			0x02	0x02	---
5	CH 1	1	4.0ms			0x01	---	---

⇒ After Log Window Filter



No.	CH.	Byte	Time	Command	Info	D01	D02	D03
2	CH 1	2	7.0ms			0x02	0x02	---
4	CH 1	2	7.0ms			0x02	0x02	---

28-3:The number of sections was changed.

The number of sections was changed. **S01~S99(total 99 kinds)**

▼ Trouble correction [Ver.1.21]

When "."(dot) existed in specified passing folder name when the obtained data and configuration file was preserved, trouble to which preserved file name and preservation place were changed was corrected.

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